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LOUISIANA STATE PUBLIC SCHOOL
TEACHERS' ASSOCIATION

REPORT

OF

Committee on Investigation of School Problems

Nature Study and Agriculture

IN THE

Public Schools of Louisiana

1909

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HISTORIC SKETCH.

At the New Orleans meeting, in 1908, of the Louisiana State Public School Teachers' Association it was suggested in the Secretary's report that the Association should offer its members something more than a copy of the annual proceedings and the rights and privileges accorded members at the yearly meeting. To that end the following amendment was offered by Mr. C. A. Ives, of Minden:

The by-laws shall be amended so that the following section shall be added and the proper changes in the numbering of the remaining sections shall be made:

"Section 3. A Committee on the Investigation of School Problems, consisting of five members, shall be appointed annually by the President. The State Superintendent shall be an advisory member and the Secretary of the Association shall be ex-officio Secretary of the committee. It shall be the duty of the committee to collect information and conduct investigations dealing with school problems, and it shall publish the result of this work in bulletins which are to be distributed among the members of the Association."

The amendment was adopted, and President Easton appointed as members of the committee: Prof. J. M. Gwinn, New Orleans; Dr. S. E. Weber, Baton Rouge; V. L. Roy, Marksville; J. O. Taylor, Bastrop, and E. B. Donnell, Abbeville.

The committee, with State Superintendent Harris, President Warren Easton and Secretary Nicholas Bauer, met in Baton Rouge Saturday, Dec. 19, and elected V. L. Roy, chairman. After discussing many problems suggested for investigation, it was decided to collect and publish information concerning Agriculture and Nature Study in the schools of the State. The general subject was subdivided into two topics: 1. Agriculture and Nature Study in the grades below the High School, and 2. Agriculture in the High School. The work of collecting and preparing the data was assigned to subcommittees, as follows: Prof. J. M. Gwinn and J. O. Taylor to handle the topic of Agriculture and Nature Study in the Grades; Dr. S. E. Weber and E. B. Donnell, Agriculture in the

High School; Superintendent V. L. Roy to be supervisory chairman of both these subcommittees.

At the urgent request of the subcommittee on Agriculture and Nature Study in the Grades below the High School, Superintendent Roy consented to prepare the draft of that portion of the report of this subcommittee dealing with the content of the course, method of teaching and material equipment.

A second meeting of the committee was held aboard the train on the way to the Chicago meeting of the Department of Superintendence of the National Educational Association. There were present at this meeting Chairman Roy, Professor Gwinn and Dr. Weber. Reports of the work done to that time were presented and discussed. A meeting of the chairman of the committee with the chairmen of the two subcommittees was called to be held in Baton Rouge on Thursday, March 18. At this final meeting the drafts of the portions of the report were submitted and unified so far as was possible in the short time available.

INTRODUCTORY STATEMENT.

The principal source of data collected for this report was questionnaire returns. Each of the sub-committees sent out a questionnaire. The sub-committee dealing with the work below the high school sent its questionnaire to each of the parish superintendents in Louisiana, except to the superintendent of Orleans parish. The sub-committee having in charge the investigation of the work in the high school sent a questionnaire to each state superintendent of public instruction in the United States and another to the heads of the universities, colleges and high schools offering courses in agriculture. Where answers to the first questionnaire sent were not received in a reasonable length of time, the committee followed up with one or more letters urging replies.

The subject of the teaching of nature study and agriculture has been so thoroughly investigated and reported on in recent years that the committee thought it unnecessary to traverse the whole field anew. It has endeavored to collect such facts and to make such suggestions and recommendations as would be of service in the solution of the problem of the teaching of the subjects under investigation in the public schools of Louisiana.

Those who wish a further discussion of the general problem of nature study and agricultural education should consult the following publications:

The Report of the Committee on Industrial Education in Schools for Rural Communities; three reports issued by the National Educational Association in the years 1905, 1907, 1908. (Irwin Shephard, secretary, Winona, Minn.)

Bulletin No. 2, 1907, U. S. Bureau of Education; a monograph by Dr. J. R. Jewell on Agricultural Education, Including Nature Study and School Gardens. This bulletin presents an exhaustive summary of what is being attempted in this and in other countries in agricultural education.

Bulletin No. 1, 1908, U. S. Bureau of Education: On the Training of Persons to Teach Agriculture in Public Schools. This bulletin was prepared by Dr. L. H. Bailey, of Cornell University.

The list of recent articles might be greatly extended but, since extensive bibliographies are contained in the bulletins of the bureau of education mentioned above it is deemed unnecessary to extend the list here.

V. L. Roy,
Chairman,
J. M. Gwinn,
S. E. Weber,
E. B. Donnell,
J. O. Taylor,
Nicholas Bauer,
Secretary.

NATURE STUDY AND AGRICULTURE IN THE GRADES BELOW THE HIGH SCHOOL.

THE NEED FOR TEACHING AGRICULTURE AND NATURE STUDY.

Agriculture is the rural phase of the great educational movement toward industrial and vocational education. This great movement is the most significant fact in the educational field today. It is a movement toward making the school a part of life, a something real and vital in its relations to natural and social environment and to the individual's needs, interests and abilities. While the movement is general over the country it is deemed wise to exhibit some concrete facts in evidence that rural Louisiana needs the introduction of the study of nature study and agriculture into all her schools.

On the basis of the information given in replies to the questionnaire it is shown that one of every three pupils in the rural schools between the ages of 10 and 18, expects to leave the farm. The principal reasons for leaving as given by the pupils in the order of frequency are: "There is no money in farming"; "The work is too hard"; "I want to do something else"; "Life on the farm is dull; the life in the town is attractive." That these reasons with others have been drawing the people from the farms to the cities is shown in that 27 per cent of the pupils enrolled in the rural schools in the period from 1885 to 1895 have left the farms.

In answer to the request, "State three observed facts in the rural life of your parish which indicate a need for the teaching of nature study and agriculture," the superintendents made the following replies: Farmers raise but one crop; the land is deteriorating; the cultural and educational ideas are low; the method of farming is bad; there is a lack of enjoyment of rural environment; the houses are poor, ugly and unhygienic; boys are leaving the farms and going to the towns; the major portion of our population lives on farms; there is no class spirit among farmers; there is great ignorance of soil qualities and of the chemical elements needed to grow the various crops; boys and some men destroy birds and other small animals which are valuable insect destroyers; there is little scientfic feeding of stock; there is a great percentage of low bred stock on the farms; the timber is subject to wanton waste in cutting. This list might easily be extended, but these facts are sufficent to show the vast opportunity for the improvement in the rural conditions in Louisiana. That there is a national need for more intelligent administration and use of our rural resources is evident from some facts noted in an editorial in the World's Work for March, 1909, where it is pointed out that we are cutting our forests three and one-half times as fast as they grow, that 260 cubic feet of forest are cut for each inhabitant in the United States, while in Germany and France but 30 and 25 respectively are required; that from one-half to two-thirds of the timber cut is wasted in the cutting and sawing. We produce but 14 bushels of wheat per acre on our rich lands, while Germany produces 28, and England 32. Our farmers raise but an average of 25 bushels of corn to the acre, when agricultural colleges have everywhere shown that 100 bushels may be raised. A loss of $659,000,000 is sustained each year through injurious insects and hundreds of millions more through preventable plant disease.

"Are rural patrons asking for agriculture to be taught?" "Who is urging it?" At random select five farmers and five rural school teachers; ask them whether nature study and agriculture should be taught in their schools and, if so, why. "What did the farmers say? What did the teachers say?" If the answers to the above questions, taken from the questionnaire, are a sufficent basis for generalization, it is evident that the great majority of farmers do not believe that a study of agriculture in the schools will remedy conditions. In only three out of fourteen instances are the farmers asking for the subject to be taught, and in ten instances out of sixteen the farmers say agriculture should not be taught. If the subject is being urged it is by educators and not by farmers. In contrast to the farmers' views, 90 per cent of the teachers say agriculture should be given a place in the school.

Here are some answers made by farmers to the question, "Should nature study and agriculture be taught in their schools, and, if so, why?" "No; the children get too much of these at home." "I want you to teach my boy arithmetic and I'll teach him to farm." "The farm is the place to study farming." "Can learn these at home."

"Get data from five schools teaching agriculture in the seventh grade; where is agriculture ranked by the pupils in this grade among their preferences for their various subjects?" There were eight superintendents who secured the data asked for in this question. Six out of every eight pupils ranked it first, only one in eight ranked it low.

One of our most fundamental principles in education holds that the subject should be interesting to the pupil. It is clear from the reports received that agriculture satisfies this requirement.

It is not logical to assume that all the ills of farm life will be cured by the introduction of and efficent teaching of nature study and agriculture in our schools. The following questions sought to ascertain what results have been secured where these subjects have been taught: "What changes in farm life and work have come through the teaching of nature study and agriculture?" "What changes in attitude, ideas and actions of the boys and girls in school have been influenced markedly by the study of nature study, agriculture and forestry?" The fact that these subjects have been taught in but few schools and there but for a few years renders the answers to these questions highly unsatisfactory, yet in the few communities where they have been taught some effects are easily noted. The most apparent effect is seen in the "lively discussions" and "great interest" of the farmers, in their "willingness to experiment" and "eagerness to be informed on subjects pertaining to their work." From the answers given, it seems that the chief present-day influence of the school on the rural life is confined to stirring up discussions and in stimulatig a desire for information. Little actual change in farm conditions have been effected. In the boys and girls studying these subjects it is noted that they "think more favorably of farm life"; "they kill fewer birds"; and through the influence of arbor day, "they are caring for and are planting more trees." "One boy who had sick cattle wrote the Department of Agriculture for directions for treatment, and, following these directions, cured his cattle." While these results are all favorable to the good influence which the teaching of these subjects has on the community life, yet they are meagre in proportion to the effects seen in such a state as Wisconsin, where the teaching has been longer in effect, more widespread and more efficient. In that state it is estimated that the increased value of farm products due to the direct influence of the teaching of agriculture in their schools amounts to more than $20,000,000 annually, not to mention the improved social coditions of rural life.

While the state course of study has included both nature study and agriculture and while teachers are expected to teach these subjects, the facts show that they are seldom taught and efficiently hardly at all. Only three of the sixteen parishes reporting show more than half their schools teaching these subjects. Nine of the sixteen parishes are doing practically nothing toward teaching these subjects. It is evident that if there is a need for the teaching of these subjects that the need has not been met by the schools.

Why agriculture has not been taught is well indicated in the reasons set forth in response to the request to "State three difficulties in the way of teaching agriculture." In nearly every instance the teachers are reported as not being prepared. In the judgment of the superintendents, but 22 per cent of the teachers are prepared to teach nature study, but 14 per cent to teach agriculture and but one in twelve to teach forestry. Next, after unprepared teachers, come lack of equipment and opposition of patrons in 50 per cent of the cases. Crowded curriculum and indifference of teachers make up the list of reasons why agriculture is not taught.

(SUMMARY.)

There are great and pressing needs for the teaching of both nature study and agriculture in the grades below the high schools in all rural communities. These needs have not been met by the schools, owing to lack of qualifications of teachers, opposition of parents, pressure of other studies and lack of material equipment.

The rural people need to be convinced that agriculture is a progressing science and that the teaching of agriculture in their schools would be of great practical value and that under the conditions which prevail, the present training given on the farm is wholly inadequate, and often positively injurious in the preparation for successful farming. There should be a campaign of education for the farmers.

There is a great need for the reorganization of the country school to meet the needs of the changed rural conditions. The recent report of the Commission on Country Life says, in effect, that the *first pressing need is a new kind of country school,* the people say the country schools do not teach the right things, nor use the right methods to fit the young for country life. The new kind of school should teach children out of doors quite as much as indoors; should teach them how to use tools, to make and to mend things used on the farm; to cook and sew and to manage farm homes and to make rural conditions more hygienic.

AIMS AND FUNCTIONS.

1. NATURE STUDY.

New subjects are usually unsettled and vague in meaning and in the educational functions claimed for them. Nature study is not in the strictest sense a new subject, yet it is new in its place in the elementary curriculum and quite unsettled in the importance attached to it by superintendents as shown by the varying amounts of time assigned to it in courses of study. There is little agreement among the leaders of the movement on the exact meaning of the term and on the content and functions of the subject. However, the public school educational world is practically agreed that it should have a place in the elementary school, and that the study of agriculture should be preceded by a course in nature study. In response to the question, "What, in your judgment, is the educational function of nature study?" the parish superintendents made replies which were in the essentials in agreement. The following are a few typical replies: To arouse an intelligent interest in nature, and to lead the children to perceive and appreciate its beauty; to help the child appreciate his environment and to prepare him for the study of agriculture; to give the children a better appreciation of nature through a better understanding of its phenomena and laws; to establish a proper relation between the pupil and his surroundings, to the end that he may learn to utilize the forces of nature advantageously.

Dr. Bailey in U. S. Bureau of Education Bulletin No. 1, 1908, has this to say of the meaning and function of nature study: "The main effort of primary and elementary teaching, so far as the agricultural phase is concerned, should be to put the pupil in touch with himself and his environment. Before the sixth grade, or its equivalent, there should probably be no agriculture as such general nature study should here control the work. It will be a mistake to try to force formal technical agricultural work in any grade below the high school.

"Every teacher should understand that the term 'nature study' is a misnomer. It does not stand for a 'study.' It is not a subject. It is not a 'method,' as this term is understood by teachers. It is an attitude, a purpose, a point of view, a mode of education. It is spirit—its underlying principle is one—to teach the things that are near at hand and that are a part of the child's environment and activities, and to teach these things for the sake of the child, rather than to promulgate a subject. It will be seen, therefore, that no good subsequent teaching of agriculture is possible without the nature study training.

"The nature study process and point of view should be a part of the work of all schools, because schools train persons to live. Particularly should it be a part of rural schools because the nature environment is the controlling condition for all persons who live on the land. There is no effective living in open country unless the mind is sensitive to the objects and phenomena of the open country; and no thoroughly good farming is possible without this same knowledge and outlook."

Prof. C. F. Hodge, in his "Nature Study and Life," says, "Nature study is learning those things in nature which are best worth knowing, to the end of doing those things that make life most worth living."

A paragraph from Dr. Jewell's contribution to this discussion is well worth including. He says, "Nature study came into our schools after efforts to teach agriculture had failed, owing to the lack of demand for it and want of preparation among the teachers, after the 'object lesson' fad had begun to die away, and when so-called 'elementary science' proved too dull even to awaken thoroughly the interests of the child. That nature study has taken."

By way of supplementing and emphasizing the ideas contained in quotations above the committee wishes to call attention to some psychological reasons for the teaching of nature study—Childhood is the period of the "reign of the senses" and of superabounding motor activity. Nature study on its content side meets the demand of the child's nature for sense stuff, and through its method of teaching the equally strong demand for doing. No other one subject quite so appropriately meets these fundamental needs of the mind of the child as does nature study.

Rousseau's "Back to Nature" prepared the way for Spencer's "On to Science." Nature study leads to science and forms the ground work of method and reservoir of raw materials for the development of each of the subsequent sciences taught in the grammar grades and high school. This is the day of the scientific spirit and method. Nature study is the avenue through which the child may be led into the "spirit of the age."

Educational psychology teaches that unless the aesthetic and religious natures of the child be given timely and appropriate methods and means of activity there is great danger of dwarfing them or of having them turn into unwholesome ways and into poisonous fields. Nature, properly studied, furnishes the child with the means he needs for the development of his innate aesthetic and religious natures. Our great nature Poet, consciously or unconsciously, stood for modern educational methods when he said,

> "Go forth, under the open sky, and list
> To nature's teachings, while from all around —
> Earth and her waters, and the depth of air—
> Comes a still small voice—"

And agricultural trend, to some extent in our cities and to a predominate extent in rural sections, is not strange; the common things of the country are needed to round out the knowledge of the penned-in city child, and to lead him away from the city and its necessary evils as much as possible, while a sympathy with their life work and surroundings—the very essence of nature study—is more needed among the children of our country homes than anything else. Experience has shown that the innate curiosity of the child may be directed toward nature in a way which will make him a keen observer, and during his comparatively few years of formal school life the acquisition of facts alone is of less importance to him than the correct habits of observation and inquiry.

2. AGRICULTURE.

Twelve superintendents answered the question "Should the teaching of agriculture be dominantly vocational?" Six said "yes" and six said "no". This is not an unexpected result, yet it is significant. For one thing, it indicates that so far as the meaning of the terms "vocational" and "cultural" is concerned school men are not at all agreed. The meaning of each of these is unsettled. "Cultural" has been broken from its ancient classical and literary moorings and has not yet found anchorage. Present day educational literature abounds in expressions by the specialists in whatever field, claiming a particular virtue of cultur arising out of the pursuit of his favored subject, be it Greek, physics, manual training or agriculture. "Vocational," too is adrift on the pedagogic sea. The specialist no sooner closes that portion of his argument for the cultural value of his subject than he launches forth on his "secondly," viz.: the vocational value. To his way of thinking his subject is a prerequisite for success in whatsoever pursuit.

This conflict between cultural and vocational arises out of the partisan view taken—seeing the problem from but one side. This attitude leads to the permanent separation of an organic whole into independent and unrelated parts and to the setting in opposition of correlative terms. In this way have been offered work and play, individual and society, theory and practice, conservatism and radicalism, interest and effort, cultural and vocational.

The point of view which the committee wishes to take is that so far as the teaching of this subject in the elementary school is concerned its function is both cultural and vocational. To the extent that the study of agriculture gives the future farmer insight into the relation of his problems to each other and to other fields of human endeavor and to the extent that it gives him a broad outlook on his work in its relation to nature and to the occupations and needs of other men it is cultural. There can be little doubt that a scientific study of agriculture would broaden the future farmers' outlook on life; more, perhaps, than any other one subject. It relates his work to climate, soil, insect life, bird life, chemistry, physics, botany, zoology, etc., as well as to the demands and processes of the whole of society. It leads him into the field of history and mathematics, literature and art. It reveals the dependence and inter-relatedness of natural and social processes and products.

The educational value of any occupation depends on the extent to which the worker follows a process from its beginning to its end. Invention and the minute division of labor have made many workers' tasks but an infinite small portion of the whole process—he makes a sixteenth of a pin or a fortieth of a shoe. Labor in such narrow fields is likely to grow monotonous and mind-killing in effect. Agriculture is one of the few occupations left to man in which he has in many instances full sweep from the initial stages in the production of raw materials up through various stages to the finished product. In all instances the process is carried through several stages. As Dewey says, each worker should perceive the social significance of what he does. Agriculture leads itself to this end more than any other vocation. For this reason the study of agriculture has a broadening effect on the mind and may be considered as truly cultural.

On the other hand, insofar as the study of agriculture acquaints the student with the knowledge needed in farming and gives him skill in the processes of farm work it is vocational. As a subject of study in the seventh grade and high school, agriculture should have a direct bearing on the work of the farm. It should turn not only its own influence in that direction, but should serve as a reorganizing force to make the other subjects of the curriculum of great practical worth for rural life. It is only by making the instruction in agriculture take this vocational trend that the real and study-compelling interests of the pupils can be reached.

In the leading article in the March, 1909, School Review Dr. De Garmo says, "No type of special training can be deemed educational that does not exercise the mind while developing skill. Consequently there is no such sharp antithesis between special and general education as has been often assumed." In speaking of the effects of pursuing specializing studies Dr. De Garmo continues, "They may have much the educational value that more general studies have." In conclusion he says, "We may dismiss most of our scruples concerning the amount and quality of culture and discipline that may be furnished by rationally conducted special schools." The committee finds itself in agreement with the opinions of Dr. DeGarmo and especially so insofar as the special subject is agriculture.

THE CONTENT OF THE COURSE IN NATURE STUDY FOR THE GRADES BELOW THE HIGH SCHOOL.

Introductory.—The importance of fixing within more or less definite limits the subject matter of the common school course in nature study and agriculture was felt by your committee. The subjects where taught at all have been taught strictly according to the conceptions of individual teachers and have lacked that measure of uniformity and definiteness that a well coördinated system of schools demands. Accordingly, an effort has been made to ascertain what is to-day the content of the course in these subjects in schools where effective work is done in them, and what modifications should be made in the State course. The questions submitted were to elicit information along the following lines:—The specific topics that can be taught which would benefit the farmers most; the topics that are of most help in other school studies; the subjects most interesting to pupils in the several grades; favorable and unfavorable criticisms of the content of the present course and suggestions for improving the course as it now exists. The answers received to these questions have been used as the basis of the course in nature study and agriculture which has been prepared and which is given below.

Unlike certain other studies, the content of the course in these subjects must vary according to local conditions. What is suitable subject-matter in nature study in the Northern or Western States may not be adapted to Louisiana conditions; plants, animal life, soil, minerals, weather,—all vary with climate, and other local conditions. Hence, any course of study, even if intended to apply to but one State, must comprise material sufficiently abundant to meet the needs of every portion of it. "We have an embarrassment of riches in nature study, and the problem in making out a course is as much one of elimination as one of selection of material."

In the course here offered only such topics have been embodied as are adapted to use in Louisiana schools; but, because of the abundance of material available, many topics have been omitted which it may be found desirable to use in some schools. It is not intended that the course herewith submitted shall be used as a whole by any teacher or in any school. Each teacher must select material adapted to local conditions; the topics to be studied by the class or school should be selected in advance; preparation should then be made on such subject-matter, and the plan adopted should be followed systematically throughout the course.

The fulness with which a given topic should be studied must be determined by the teacher and must be adapted to the advancement of the child. Flowers may be studied in the first grade or in the fifth grade; but it is evident that the treatment will be different in the two. In the former the purpose may be chiefly to note the form and color, learn the name, and appreciate the beauty; in the latter the object may be to discover nature's way of preventing self-pollination or the adaptation of the flower to insect pollination. The study of the cat in the first grade may be to develop a kindly feeling for pets and animals in general; but the study of animals in the fifth grade may be for the purpose of discovering the adaptation of the several species to meet certain needs of man.

It has been the desire of the committee to make this course as specific and definite as conditions permit. In our effort to attain this end our freedom of action has been limited by the following considerations: (a) The need of a course broad enough to comprise some of the different forms of animal and plant life found in the various portions of the State. (b) The expediency of including in the course material adapted to teachers of different grades of attainment. (c) The necessity of making the scope of the course sufficiently comprehensive to be the basis for work in city, town and rural schools. Yet, your committee believes that the course here given has enough of concreteness and definiteness to recommend it to all teachers of nature study and agriculture in Louisiana. Particularly is the attention of teachers directed to the references, books, chapters and pages given in parentheses. With the necessary books at hand (see under "Method") any teacher may find abundant material for the different topics included in the course, as well as methods for presenting the subject.

Nature stories and myths, poems and selections, appropriate to the subject, should be read to the class or by the pupils in connection with the practical out-of-door observations and class-room study of each topic. Material of this sort abounds in many of the books found on the library list, several of which are named under "Equipment" (see Books).

In the preparation of the course your committee has been guided by the following general principles: The natural interests of Louisiana boys and girls; the economic, educational and aesthetic values of the material employed; adaptation to Louisiana conditions and environment; correlation with other branches of study, and the training and competency of the teachers of the State.

The content of the course in nature study is presented under four heads:—1. Land, water and sky. 2. Animals. 3. Plants. 4. School gardens.

COURSE IN NATURE STUDY.

FIRST GRADE.

LAND, WATER AND SKY.

Land.—Contour, hills, valleys, levels, natural scenery.

Water.—Bayou, rivulet, flow, drainage.

Sky.—Weather, sunlight, moonlight.

ANIMALS.

Domestic Animals.—Cat, pig, lamb.

Birds.—Mocking bird, canary, English sparrow, lark, red-headed woodpecker, enemies of birds, taming and feeding birds.

Insects.—Cabbage butterfly, hawk-moth, tomato worm or sphinx moth, plant lice.

Fishes.—Gold fish, minnows, shiners.

Miscellaneous.—Earth worms, turtles.

PLANTS.

Trees.—China tree, cottonwood, sweet gum.

Garden Flowers.—Sweet pea, nasturtium, honeysuckle, violet, jonquil.

Wild Flowers.—Spring beauty, wild violet, blackberry, black-eyed susan.

Vegetables.—Radish, lettuce, cabbage, onion.

SCHOOL GARDEN.

Vegetables and cultivated flowers listed above; sword, ostrich plume and maiden-hair ferns indoors; germination of peas in classroom.

SECOND GRADE.

LAND, WATER AND SKY.

Land.—Conformation, drainage areas, wearing of soil.
Water.—Rivers, swamp, high water, evaporation, freezing.
Sky.—Sun, phases of moon, stars, clouds, shadows, seasons.

ANIMALS.

Domestic Animals.—Dog, cow, hen, breeds, calls of animals.

Birds.—Bird census of district, migration of birds; blue jay, robin, red-winged blackbird, chimney swift, grossbeak, dove.

Insects—Tent caterpillar, bollworm, silkworm, swallowtail butterfly, cocoons and chrysalids, locust, grasshoppers, crickets, candle bug, lice, clothes moth.

Fishes.—Trout (black bass), bar fish and perch.

Miscellaneous.—Crawfish, bullfrog, bat.

PLANTS.

Trees.—Elm, catalpa, oak and peach trees; leaves.

Garden Flowers.—Verbena, petunia, narcissus, cypress vine.

Wild Flowers.—Wild primrose, jessamine, phlox and verbena, dandelion, golden rod, dogwood bloom; seed dispersal.

Weeds.—Pigweed, wild coffee, wormseed, tie-vine, horse-nettle.

Vegetables.—Peas, beans, turnips, peppers, onions (seed).

Flowerless Plants.—Spanish moss, lichens.

SCHOOL GARDEN.

Vegetables and flowers listed above; ferns and begonias indoors; sprouting of beans in class-room. Setting out trees.

THIRD GRADE.

LAND, WATER AND SKY.

Land.—Classification, soils, rocks.

Water.—Underground water, springs, rain, dew, frost, condensation.

Sky.—Eclipses, evening and morning stars, rainbow, wind.

ANIMALS.

Domestic Animals.—Horse, goat, breeds.

Wild Animals.—Rabbit, squirrel.

Birds.—Domestication; quail, cedar bird, common blackbird, humming bird, pigeon, crow, kingfisher, night hawk.

Insects.—Ants, honeybee, bumblebee, wasps, house fly, dragon and damsel flies, corn and boll weevils.

Fishes and Amphibians.—Catfish, buffalo, tree frog, lizard.

PLANTS.

Trees.—Oak family, pine, hickory, cottonwood, poplar, pear trees; appreciation of trees.

Garden Flowers.—Portulaca, candytuft, sweetwilliam, poppy, Easter lily, water hyacinths, sunflower, bridal wreath, morning glory.

Wild Flowers and Weeds.—Field daisy, buttercup, may-apple and anemone; jimson weed, beggar tick, wild carrot, cocklebur, thistle, poison ivy, mistletoe.

Flowerless Plants.—Mushrooms, puffballs.

SCHOOL GARDEN.

Vegetables.—Sweet and Irish potatoes, beets and mangels, spinach, strawberry.

Flowers.—Garden flowers list above.

Trees.—Oaks, camphor trees.

FOURTH GRADE

LAND, WATER AND SKY.

Land.—Soil formation, erosion, sediment, deposits, minerals, scale plat of school lot.

Water.—Effect on physiography of district and parish.

Sky.—Weather maps, thermometer, planets and stars, shooting stars.

ANIMALS.

Domestic Animals.—Barnyard fowls, breeds.

Wild Animals.—Opossum and raccoon.

Birds.—Oriole, bluebird, catbird, cowbird, sparrows, cardinal, martin, king-bird, screech owl, hooting owl, hawks, buzzards, pelicans, seagulls; game laws.

Insects and Bugs.—Cutworms, cankerworms, peach tree borer, chinch bug, squash bug, stink bug, mosquitos.

Fishes.—Garfish, red snapper, carp; fish laws.

Amphibians.—Toad.

PLANTS.

Trees.—Maple, sycamore, ash, walnut, pecan, plum and orange, magnolia, live oak, holly; tree planting.

Shrubs and Small Trees.—Pittosporum, cape jessamine, sweet olive, japonica, pomegranate, privet.

Garden Flowers.—Phlox, pansy, iris, calla lily, flag lily, crocus, hydrangea, calladium; garden designing.

Wild Flowers.—Clovers, purple aster, Indian turnip, wild onion, trumpet vine.

Weeds and Wild Flowers.—Burdock, pokeweed, ragweed, camomile, purslane.

SCHOOL GARDEN.

Vegetables.—Tomato, cucumber, pumpkin, squash, salsify and endive.

Field Crops.—Rice, oats, barley, corn.

Flowers.—Garden flowers listed above.

Trees.—Walnut, pecan, hickory.

FIFTH GRADE

LAND, WATER AND SKY.

Plat of school district; rainfall; weather maps and forecasts; review of minerals; common metals, iron, copper, tin, silver, lead, zinc.

ANIMALS.

Domestic and Wild Animals.—Review; distribution; chief breeds; also wildcat or catamount, deer and skunk.

Birds.—Ricebird, woodcock, sandpiper (papabotte), plover, snipe, house wren, warblers, swallows, vireos, grackle, coot (poule d'eau), wild duck and goose, rail (mudhen), herons; game laws.

Insects, etc.—Cattle ticks, botflies, hornflies, spiders, centipeds, ladybirds, cucumber bettle.

Miscellaneous.—Snakes and lizards; oyster, mussel, snail.

PLANTS.

Trees.—Cedar, cypress, locusts, hackberry, mulberries, persimmon, fig, cherry, althea, azalia, oleander, arbor vitae, hibiscus, magnolia fuscati.

Flowers.—Daisy, aster, carnation, chrysanthemums, pinks pollination; plant propagation.

Wild Plants.—Muscadine, wild grape, weeds.

SCHOOL GARDEN.

Vegetables.—Eggplant, cauliflower, okra, butterbeans, celery.

Field Crops.—Cotton, cane, sorghum, teosinte, millet, peanuts, cowpeas, velvet beans, soy beans.

Flowers.—As listed under plants above.

THE COURSE IN DETAIL.

FIRST GRADE.

Land, Water and Sky.—Contour of land observed in a general way; excursion to a picturesque point, hill, stream (Frye, p. 82), woods, prairie, swamp; alluvial formation and higher levels near rivers and bayous; typical stream of vicinity, its course, size, region drained (Scott, p. 462); drainage of road and field after rain; purposes of canals, uses of streams; natural scenery of the district.

Weather, changes from day to day; bright and sunny days and effects on nature; dull, gray days; rainy and stormy days; gusty days of March; hot, sultry days; lead pupils to be weather-wise; note beautiful sunsets; the world at dawn; meet class on bright, moonlight night; beauties of sky (Wilson 2, p. 65, 67, 70); changes in face of moon as weeks go by (Holden, p. 26).

Animals.—Make lists of animals known by the class; tame and wild animals; birds and fishes; insects and bugs; add to list as knowledge of pupils is extended; study cat (Scott, p. 449; Hodge, p. 41); pig and lamb (Stickney, p. 90); emphasize habits and actions rather than structure (Holtz, p. 71; Hodge, p. 33).

Birds.—Mocking bird and canary; live specimens in class; form, color, flight, position on limb, food, variety of songs in daytime and at night; nest and nest-building, care of young, economic value (Holtz, p. 99-131; Hodge, p. 305). Study English sparrow (Hodge, p. 313; Holtz), meadow lark (F. B. No. 54, p. 21; Yearbook, 1905), and red-headed woodpecker (Eckstrom, Chap. IX; Kelly, p. 187; Cooke, p. 29; Holbrook, p. 15; Walker, p. 90 and 207). Enemies of birds as observed by pupils; cat, snake, English sparrow (Hodge, p. 310-317). Taming and feeding birds (Hodge, p. 347).

Insects.—Cabbage butterfly, form, color, where eggs are laid, hatching, work of the worm. Gather the eggs on the under sides of cabbage leaves; place in insect cage, watch hatching in four to eight days; rear insect through different stages; find pupae in garden and note coming out of butterfly (Holbrook, p. 10; Smith, p. 20; Hodge, p. 225). Similarly study the hawk-moth; watch for it at dusk going from flower to flower (Burnet, p. 106); Hodge, p. 207; Smith, p. 59). Collect the large green worm from tomato plants, rear in insect cage; formation of pupa; find these by digging around plants on which the worms have fed (Kelly, p. 76). Plant lice (aphis); appearance in fall and early spring in garden and field; collect leaves covered with lice; damage to such plants as cabbage, cotton, melon; method of destruction (Hodge, p. 210; Kelly, p. 118; Smith, p. 17 and 40). Begin making a collection of butterflies, moths, and bugs for the cabinet.

Fishes.—Gold fish, minnow and shiners; food, color, appearance, movement through water; keep in aquarium and try to feed on small insects and bugs (Wilson 2, p. 108; Hodge, p. 413).

Miscellaneous.—Earthworms; make collection of and place in terrarium; motion of way of burrowing, food, as food of other animals, uses in soil, where abundant, economic significance in leveling the land and production of humus (Hodge, p. 424; Wilson 2, p. 200). Study live specimen of common turtle kept in aquarium; remember sunning habits and provide accordingly; feed earthworms and try other foods (Hodge, p. 410; Holtz, p. 163).

Trees.—Make lists of known trees; add to it as pupils learn others; have it in mind during the first five years of pupil's life in school to teach him to know the following trees at sight:

Evergreens: Live oak, pine, cedar, camphor, holly, magnolia, laurel, ligustrum.

Deciduous: Common varieties of oaks (white, cow, water, red, post, pin, overcup, etc), sweet and black gums, poplar, cottonwood, hickory, walnut, pecan, ash, maple, catalpa, sycamore, hackberry, mulberries, black locust, elm, cypress, willows, dogwood, sassafras, cherry, persimmon, chinquepin, hawthorn.

Shrubs: Magnolia fuscati, sweet olive, arbor vitae, pittosporum, japonica, oleander, cape jessamine, boxwood, hibiscus, cherokee rose, crepe myrtle, althea, pomegranate, elder, lilac.

Study three or four common trees such as cottonwood, sweet gum, china tree and walnut; become familiar with the tree, its size, shape, appearance in winter and summer, form of leaves, nature of bark and limbs; watch for opening of bud and flower in early spring; color of first leaves; color in late spring and early winter; gather fruit or seed, and place in cabinet; uses of trees (shade, shelter for birds, retainers of rain water, fuel, lumber, landscape gardening, etc.). Learn to care for and appreciate trees. (Hodge, p. 365; Scott, p. 531; Stokes, p. 72).

Flowers.—Make lists of known garden and wild flowers, to be added to as others come within the circle of the child's knowledge; have children bring new flowers to study in class; when names are not known, consult florists or patrons. Study fall flowers and violet, jonquil, nasturtium, sweet pea and honeysuckle; adapt subject to season; use flower seed catalogs and search text-books for material (Burkett, Stevens and Hill, p. 267). Use flowers and leaves gathered from school garden.

Common wild flowers, such as spring beauty (Wilson, p. 213); black-eyed susan, wild violet and bluet, blackberry bloom as type of rose family (Dana, p. 235). Flower calendar (Hodge, p. 104).

School Garden.—Plant the garden flowers named above; time of planting, method of caring for, appearance of seed, plant, stem, leaf and flower. Select one flower and have contest for production of finest specimen.

Plant lettuce and cabbage indoors, to be transplanted to garden in early fall or spring. Note germination and development of small plant. Transplant to garden and observe growth. Plant radish and onion sets in garden, and ferns in boxes or pots in the class-room. (See Burkett, Stevens and Hill, Chap. XI). Germinate peas in box, and make study of the plant (Scott, p. 579; Dana, p. 240), leaves, roots, root hairs, etc. Seeds may be sprouted between flaps of old flannel or in clean sand kept moist.

At the beginning of the school garden work teach pupils the use of garden tools in simple operations, such as light hoeing, raking, weeding, sowing, watering, shading. Have every row straight; accept nothing but the child's best work; teach him that there is a best, and that he should always work toward it. (Holtz, p. 263; Kern, Chap. IV).

Make a collection of common flower, vegetable and general crop seed, and place in cabinet; have pupils grow familiar with these. Plant class trees, as china, cottonwood and sycamore, where a quick shade is needed. Plant during January or February camphor seeds, peach stones and live oak acorns in garden for future use (Kern, Chap. III).

SECOND GRADE.

Land, Water and Sky.—Study the conformation of the land in the district with more fullness; find the stream that drains the school lot; follow it, note drift and wearing away of the soil; deposits of silt, sand and gravel (correlate with geography); vegetation along borders. Excursion to river or bayou during high water; source of high water. Drying of soil in road, field and forest; which drains and dries first? Cause? Wet clothes; vessel in class-room. What becomes of the water? Agencies causing evaporation (Scott, p. 465). Evaporation in tea-kettle; illustrate, using beaker and alcohol lamp; relation of heat to rapidity of. Formation of ice; note process (Scott, p. 491). Apparent movement of sun in sky; low in south in winter; high in summer; mark by sticks direction of rising and setting at opening of school, on Dec. 21st, and again before close of school; relation of position of sun to length of day and night; sun dial (Holden, p.

71). Shadows. Meet class at night; study phases of moon more fully; record phases on moon chart; full moon rises at sunset; why? Distances to the moon and sun compared; relation to new moon; north star (Holden, p. 7); does it appear to move? Do other stars move?

Marked changes in weather; weather chart. Clouds, shape, size, height, color, movement (Scott, p. 480; Wilson 2, p. 253). Rain clouds, shadows of clouds. Seasons, beginning of each; nature's accompaniments as seen in budding trees and grass; songs of birds, music of toads in spring; growth of plants in field, lawn and forest in summer; harvest days, falling leaves and migration of martin in fall; bleakness, frost, ice and coming of robins and other birds in winter.

Animals.—Continue lists of known animals, birds, fishes, insects, bugs, amphibians, etc. Study the dog, use to man, faithfulness, obedience. keen sense of smell, courage, strength, endurance, speed, breeds known (Hodge p. 37; Dana, p. 160). The hen and chick (Stickney, p. 12); and cow (Stickney, p. 80 and 90). Adaptations of these to needs of man; food and care. Observe the calls of animals, as in hen and cow; demonstrations of the dog (Holder, p. 178). Begin to emphasize breeds and varieties in animals (F. B. No. 51, Standard Varieties of Chickens).

Birds.—Begin a bird census of the district by noting number of bird nests within a certain district. Make a chart of the area covered and locate each nest on it (Hodge, p. 319). Observe migration of birds out of and into the district; date of leaving of barn martins; date of appearance of robins, cedar birds or waxwing and other migratory birds; passage of geese on their journey to the south in early winter, and to the north in March; reasons for migration of birds. Bird calendar (Holtz, p. 90, 116, 415). The bluejay, study points suggested under first grade for the mocking bird. Is it migratory to any extent? Emphasize food and economic value, begin study of structure in an elementary way. (Holtz, p. 99; Walker, p. 123; F. B. No. 54, p. 14).

Study other birds as time allows; the robin (Walker, p. 27; Cooke, p. 24 and 26; Holtz, Chap. IX); dove; red-winged blackbird (Walker, 60; F. B. No. 54, p. 19), chimney swallow. Make a bird house for the school; induce pupils to have them at home (Holtz, p. 145-6). Develop sympathy and disposition to protect our song birds (Hodge, p. 344).

Insects.—Make collection of cocoons and chrysalides during winter; place these in insect cage, and note development; rear worm, pupa and butterfly or moth from eggs laid after hatching. Study the swallowtail butterfly (Kelly, p. 15); tent caterpillar (Kelly, p. 30; Hodge, p. 195); bollworm (Smith, p. 37; Scott, 427; Hodge, 225); silkworm (F. B. No. 165; Chamberlain 2, p. 85; locusts (Burnet, 86; Holder, 255); grasshoppers (Wilson 2, p. 53); crickets (Kelly, 103).

Fishes.—Study the green trout or black bass, barfish and the common perch in pond and stream. Feeding tests. Observe spawning season and habits; structure, breathing. Much of this work can best be done by use of the aquarium (Holtz, p. 165-174).

The crawfish, shape, structure, habits, food, method of carrying and caring for young, use as food. Mount specimen on card for cabinet. (Burnet, 67; Kelly, 67). Study bullfrog in similar manner; note spawning season, length of life of tadpoles (two years), and value to man of tadpoles and bullfrog (Hodge, 295; Kelly, 41; Wilson 2, p. 25). The bat, particularly as to its economic value (Hodge, 405).

Trees.—Study the peach tree as type of fruit trees; the elm, catalpa, and a variety of oak, the red or water oak Follow directions given under First Grade, but study buds and fruit or seed in greater detail; note blossom carefully, its development from the bud, formation of fruit, growth of branch tips, dropping of leaves. Make the study systematic, extending it throughout the term at proper intervals. Continue developing greater familiarity with common trees. Place more stress on uses of trees in nature and to man (Stokes, 16, 55). Begin noting forms of leaves, parts, arrangement on stem. (Dana, 135, 165, 167).

Flowers—Add cultivated and wild flowers to "known" list of first grade. Study verbena, petunia, narcissus, hyacinths and other bulb plants; also the cypress or other common vine. Begin to direct attention to the dust boxes and other essential parts of the flower. Have a variety of flowers in the school garden for use in this work. Of the wild flowers, study the phlox, verbena, primrose and jessamine; relation to cultivated varieties; the dandelion in spring (Scott 1, 381; Dana, 247; Wilson 2, p. 252) and the golden rod in fall (Dana 251; Cooke, 13); note provision for scattering their seeds; study the dogwood blossom while out on the early spring excursion (Dana, 52-67); study such common weeds as wild coffee, wormseed, pigweed, and horsenettle; abundance, seed, spread, control (B. S. and H. 73; F. B. No. 28).

School Garden.—Plant peas in early fall, early variety in early fall for crop before frost in southern parts of Louisiana; or late variety for crop after frost; in northern portions of State, plant early varieties in early spring. Bush beans, plant after frost is over. Plant turnips at opening of school in the fall, and onion seed for plants to be set out or transplanted when the size of a goose quill. Grow sweet or bell pepper plants in box in class-room, to be set out in garden in spring Sprout bean seeds in class-room in box and between layers of flannel; study growth of roots, stem and leaves; find purpose of cotyledons (Laing; Scott, 571, 596; Dana, 79, 94). During winter set out budded peach tree grown from stone planted in first grade (Hodge, 174); also plant class trees on school grounds, selected from those that are studied during the year. Plant walnuts, hickory nuts and pecans during winter, marking place carefully. Suggest planting peach trees in home orchard by each pupil (Burkett, Stevens and Hill, Chap. IV).

THIRD GRADE.

Land, Water and Sky.—Classify the lands of the district as prairie, woodland, alluvial soil, swamp, hills; as forest, field and pasture lands. Study different kinds of soil in district, clay, loam, sandy soil, etc.; different kinds of rocks found in neighborhood. Do well diggers in your district always find sand? If so, at what depth. Study springs in the locality; discuss underground water, its source, how it flows, relation to wells. Extend study of evaporation. Note condensation of moisture on window panes, pitcher of iced water, on cold looking glass when breath is blown upon it, on grass in late afternoon; formation of dew and frost (Holden, 116); causes; condition on cloudy night (Scott, 486). Discuss rain; observe approaching showers and clouds from which they come (Scott, 506).

Observe an eclipse of the moon, and develop cause (Holden, 33). Find Venus, an evening star, and observe movement toward or away from the sun; find her again later a morning star. Point out the great and little dippers, and note revolution around North star (Holden, 7). Observe rainbows, primary and secondary; colors of; illustrate with glass prism; cause of; position with respect to sun and observer (Wilson 2, p. 42). Teach directions, using magnetic compass. Observe and make record of directions of the wind; can you discover sequence of directions from north to east, and south to west? What does each wind bring, rain or clear weather, dampness or dry air? Make and fly a kite; windmill.

Animals.—Study the horse (Hodge, 38) and goat (Farmers' Bulletins), in their relation to man. Study structure, adaptation to man's needs, habits, food, etc. The rabbit (see full treatment in Scott, p. 38) and squirrel (Hodge, 407; Kelly, 202, 211).

Birds.—Make a study of domestication of birds (Hodge, 327) and extend study and practice of taming and feeding birds. The quail, or bobwhite (Yearbook, 1903; Walker, 116), humming bird (Holder, 78; Walker, 129; Holbrook, 1); cedar bird or waxwing (Walker, 159), pigeon, crow, blackbird or grackle (F. B. No. 54), crow (Wilson 2, p. 141; Thompson-Seton), kingfisher, night hawk (Holder, 21). Learn closed season for all birds studied, and continue observation of food, habits and enemies (F. B. Nos. 197 and 308).

Insects.—Study the family insects; ants (Hodge, 415; Cooke, 18); honeybee (Hodge, 228; Holtz, 205, 225 and 456; F. B. No. 59), and wasps and hornets (Hodge, 244). The house fly (Hodge, 62; F. B. No. 155); dragon fly (Dana, 149), damsel fly (Hodge, 257); the corn and boll weevils (Circulars of Pest Commission, Baton Rouge; F. B. No. 45; Burkett, Stevens and Hill, 144, 298).

Fishes.—Continue observations of common fishes, the different varieties of catfish and the buffalo; place small catfish in aquarium and make food tests. Study tree frogs, varieties, melody of notes, adaptation to climbing (Hodge, 295) and lizards (Hodge, 410).

Trees.—Make a systematic study of all varieties of oaks common to the district; compare leaves, barks, acorns; make collection of each, label properly, and place in cabinet (Cooke, 71). The hickory, cottonwood and pine; as in previous grades, emphasizing economic value and marketing of each; watch development of buds in early spring; compare the three; note flowers, and make collection of seed (Scott, 410). If convenient, make excursion to a turpentine still, and study process of manufacture of turpentine and rosin. Study the pear tree as to shape, size, trunk, leaf, bud, flower and fruit; observe pear blight, rapidity of spread, and discuss use of knife and fire in saving infested trees.

Flowers.—Study the flowers grown in the garden; observing the several parts of each flower; the sunflower as type of composite family (Dana, 255); poppy (Dana, 70); Easter lily; water hyacinth as an aquatic plant, noting adaptation to floating; morning glory (Scott, 583 and 602). Develop appreciation and enjoyment of flowers (Burkett, Stevens and Hill, 268). Observe the field daisy (Dana, 249), buttercup, may-apple and anemone; collect and press wild flowers. Thistle(jimson weed, wild carrot, tick trefoil (Dana), and means of dispersing their seeds (B., S. and H. 73; Dana, 50-69). The mistletoe as a parasite; observe bloom and seed; how adapted for distribution. Poison ivy (F. B. No. 86). Continue study of seed dispersal by wind, water, birds and animals; through means of down or feathers, as in the thistle, dandelion, milkweed, aster, golden rod, willow and cottonwood; of sails, as in the maple, elm, ash pine etc.; of barbed seeds, as in the burdock, beggar lice or tick trefoil, cocklebur and sticktight; of bursting pods, as in the pansy and violet; of waving seed boxes, as in the poppy; make collection of seeds and seed pods specially adapted for dispersal.

Flowerless Plants.—Observe different varieties of mushrooms, growing in neighborhood; find the common edible type (campestris); place flat side of crown on sheet of white paper and note deposit of spores. Collect puffballs, all of which, so far as known, are non-poisonous; note amount of spores on bursting of ball (Hodge, 443 and 448).

School Garden.—Plant beets and mangels in early fall or spring; Irish potatoes in February or March, according to latitude; set out sweet potato vines in May or June. Study these crops; note that the last named is an enlargement of the root; that the Irish potato is a tuber growing from the stem underground; observe method of propagating each. Set out strawberry plants about November; these should bear in early spring; study the flowers of the strawberry (F. B. No. 198); are they all fertile? Plant spinach or mustard either in early fall or spring; observe attacks by plant lice; try soap solution to destroy them. Set out camphor trees grown from seed planted in first grade; also oaks. Plant seeds of other trees to grow on school grounds.

FOURTH GRADE.

Land, Water and Sky.—Observe erosion by rain and running water; deposit of sediment; determined by flow of water; correlate with geography; formation of alluvial lands by rivers and bayous; uses of these in nature and commerce; study minerals of locality, sulphur, salt, oil, gas; measure school lot, locate position of house and outhouses and trees; draw scale plat; suggestions for improvement of grounds by addition of trees, shrubs, vines and flower beds; use as large a scale as convenient, say 1 inch to 10, 20 or 40 feet, according to size of lot.

Extend study of physiography from district to ward and parish, noting rivers, bayous, swamps, prairies, woodlands, lakes, public roads and ward lines. Learn to read the thermometer and make morning and afternoon records of temperature out of doors. Study weather maps obtained from Weather Bureau ,New Orleans, noting particularly rain areas, change in directions of wind from day to day (Holden, 114). Continue seasonal observations, particularly of trees and flowers; hibernation of insects, frogs, etc. If in farming district, note time of cleaning fields, particularly in boll weevil sections; plowing, sowing, tilling, harvesting and marketing; record observations in nature study notebooks. Continue study of the heavens; find other planets besides Venus; locate bright stars like Sirius; note milky way and its gradual run across the sky; shooting stars (Holden, 39).

Animals.—Study the different varieties of pure-bred fowls in the district; note characteristics of each as to form, size, weight, laying and sitting habits; among chickens, learn such breeds as brahma, cochins, langshans, wyandottes, Rhode Island reds, plymouth rocks, leghorns, etc. (F. B. No. 51); chief breeds of ducks, turkeys (F. B. No. 200) and geese (F. B. No. 64). Study opossum and raccoon; get live specimens for study in class, if possible

Birds.—Continue study of birds (Walker, 17, 53, 167; F. B. No. 54; Hodge; Holtz; 1905 Yearbook) as suggested for other grades; Baltimore oriole (Walker, 53), bluebird, catbird and sparrows (F. B. No. 54); extend knowledge of pupils to include recognition at sight of all common birds in district; observe preying habits of owls, kingbirds and hawks; extend study of game laws (see below), learning closed and open seasons for game birds; organized system for protection of birds, Audubon Societies (Hodge, 344;

Holtz, 138); bird day in schools (pamphlets of State departments of education). Continue practical work of domestication, taming and feeding birds, as begun in lower grades; develop greater appreciation of birds as songsters and insect and vermin destroyers; estimate values of certain birds in economy of garden, farm and orchard.

Game Laws.—Act No. 277, 1908, makes following game birds: Geese, brant, wild sea and river ducks, wood ducks, rails (mud hens), coots (poule d'eau), gallinules, snipe, woodcock, sandpipers (chorooks and papabotte), tattlers, curlews, plover, wild turkey, imported pheasants, grouse, prairie chicken, quail and doves. The closed seasons of these birds are as follows: Doves March 1 to Sept. 1; geese, brant, ducks, rails, coots, gallinules, tattlers, curlews and plover, from March 1 to Oct. 1; turkeys cocks from April 15 to Nov. 1; quail and woodduck from March 1 to Nov. 1; snipe, sandpipers, from May 15 to Sept. 1; blue-winged teal ducks, from April 15 to Oct. 1. Woodcock and prairie chickens are not to be killed nor had in possession at any time until Dec. 1, 1910; and thereafter from Feb. 1 to Dec. 1 of each year.

Act No. 198 of 1906 makes following, in addition to above, game birds: Cranes, ortolans or cedar birds; all other native and migratory birds are made non-game birds by section 2 of this act. Section 3 makes it unlawful to kill, catch or have in possession, living or dead, any resident or migratory bird other than a game bird. The destruction or robbing of bird's nests or eggs is prohibited by section 5.

Act. No. 121 of 1906 makes unlawful the snaring, trapping or capture of deer; the killing of a doe or fawn at any time; the killing or hunting of deer between hours of sunset and daybreak; the killing of any deer during seven months in the year, to be fixed by the Police Juries of the several parishes.

The closed season for fishes is as follows: Black bass (green trout), Feb. 1 to May 15; striped bass (bar fish), Dec. 1 to March 1; catfish (excepting spoonbill and buffalo), March 1 to May 1; all other species from Dec. 1 to March 1 in each year.

Insects and Bugs.—Find cutworms, cankerworms, and peachtree borers (1905 Yearbook, p. 330); make more systematic study of life history of the butterfly and moth, teaching name of insects at different stages (Smith, 6-7); learn plans for extermination (Smith, 12 and 13; Hodge, 187, 196, 198). Gather chinch, stink and squash bugs for insect cabinet; observe mode of feeding by puncturing; uselessness of ordinary poisons in their destruction; structure, breathing pores, and method of extermination by spraying, use of insect powders, trapping and hand picking (Smith, 11, 55; Burkett, Stevens and Hill, Chap. VI; Hodge, 226; Holtz, Chap. XIV.) Study different varieties of mosquitos (Mosquito Destruction, N. O. Board of Health, 1902-3) ;rear in class-room, note life changes; hatching, development, coming out of full grown insect; relation to diseases, as malaria, yellow fever (F. B. No. 155).

Fishes.—Extend observation of common fishes of locality; note foods, habits, haunts, spawning season, value as food; protection by fish laws. (See under birds, above).

Toad.—Find number of toads on school and home premises; note habits as nocturnal animals; place a pair in aquarium; make feeding tests; estimate value of toad to garden and farm; protective coloring and habits; life history; song of, (see Hodge, Chap. XVI for method of study and full treatment of subject).

Trees.—Sycamore, ash, walnut and pecan, as types of deciduous hardwoods; magnolia, live oak, and holly, as types of evergreens; plum and orange trees as types of fruit trees. Observe more closely the budding of trees in spring; appearance and form of flowers; formation of fruit or seed; economic values. Continue developing greater appreciation of trees; keep in touch with the work of such organizations as The New Orleans Tree Society; study best methods of planting trees (F. B. No. 134).

Shrubs.—Develop familiarity with more common shrubs of district, noting size, shape, growth, flowers, time of shedding of leaves; the pittosporum, privet, pomegranate, japonica, cape jessamine, sweet olive, etc.; use in decoration of home and school grounds.

Flowers.—Study common garden flowers with a view to greater familiarity; note time of planting; depth to plant bulbs; form of flowers, as in calladium of elephant ears; have competitive flower garden designing; study flower seed catalogue. Study the clovers and such wild flowers and weeds as clovers, aster, wildorison and trumpet vine; burdock, pokeweed, ragweed, camomile, and purslane, noting natural methods of distribution or dispersal of seed of each; extend study of seed dispersal; also of different parts of flower, calix, corolla, stamens, and pistels; learn names, aud explain function of each (Burkett, Stevens and Hill, 44).

School Garden.—Plant tomatoes in early spring; plants should be grown in class-room by sowing in box early in March in central part of State; note manner of growth; prune shoots as they come out anad leave main stalk only; make provision to keep fruit from touching the ground; look out for tomato worms (F. B. No. 220). Plant salsify and endive in garden in early fall or spring; tie up latter at proper time for bleaching; lead pupils to plant these vegetables in the home garden. Plant cucumber, squash and pumpkin after frost in spring; early cucumber may be started in hotbed (Burkett, Stevens and Hill, 250), transferred to old frame, and then transplanted to garden; in this case plant in separate strawberry boxes, or plant direct in school garden after frost in spring. Study staminate or sterile flowers and pistillate or fertile flowers in each of these plants; enclose fertile flower in tissue paper bag to exclude pollen, and note effect; remove stigma on several flowers, and note pollen scattered by them.

Plant oats and barley (such as winter bearded) in early fall; corn in latter part of February or in March, according to latitude; rice in April. Study these as types of grain crops; note flower of each plant; study wind pollination of corn; make germination test to determine per cent of vigorous seed (F. B. Nos. 298, 199, 81, 253, 229 on corn; Nos. 276, 225, and 250 on oats; No. 110 on rice).

Grow flowers for the garden on flower beds, such as phlox, pansy and lilies; plant crocus bulbs in glass dish filled with rocks and water in class-room; also out of doors; set out hydrangeas and elephant ears in shady corners. Transplant to appropriate spots on school grounds trees grown from seed in garden. Plant magnolia, holly and maple seeds and mark spot.

FIFTH GRADE.

Land, Water and Sky.—Make careful inspection of vicinity of school, noting directions and measuring distances; draw plat of district to suitable scale, locating roads, farms, creeks or bayous, and trees; use scale of 1 inch per 100 feet. Keep rainfall record throughout term; compare amount of fall of different months; relation of plant growth and crops to rainfall. Continue noting the weather and study more fully the weather maps; observe areas of high and low pressure, and relation to direction of winds and rain areas. If a barometer is available, learn to read it. Discuss value of weather forecasts to farmers, fruit growers, truck gardeners, sea vessels, etc. (See "Weather Bureau and the Public Schools," Reprint 1907 Yearbook.)

Extend study, by observation and simple experiments, of minerals common to district; observation of common metals; learn to distinguish these; visit blacksmith shop when studying iron and note process of welding; also tinsmith's shop, when studying tin and zinc. How is galvanized iron made? Tin plate? Brass? What are alloys? Per cent of pure silver in coin? Uses of each metal.

Animals.—Review study of farm animals as to structure, value to man, distribution, important breeds (F. B. No. 160 and 200) habits of wild animals not included in lower grades, such as wildcat, deer, fox, skunk.

Birds.—Extend study of birds common to the neighborhood; ricebird or bobolink (F. B. No. 54), snipe (Holder 113), house wren (Walker 68), warblers and swallows (Walker 150; Lange).

Continue study of game laws.

Insects, etc.—The cattle tick, growth, shedding of skins; food dropping to ground of full grown tick; laying eggs in pasture land; find eggs and small ticks among the grass; study the methods of controlling and of eradicating from pastures. Observe habits of botflies (Hodge 419) and hornflies, breeding, injury to stock. Spiders, varieties, structure, habits, food, spinning of webs, value as insect destroyers (Hodge 419; Cooke 19.) Ladybirds or ladybugs, varieties of, breeding places, value in destruction of plant lice (Hodge 254), cucumber beetle (Smith 42.)

Snakes, Etc.—Learn to recognize the common snakes and lizzards of the district; divide into venomous and harmless; study habits, foods, economic value (Hodge 412). Much detailed information on snakes can always be obtained from farmers and close observers. (Holtz 161; Burnet 154). Study the fresh water mussel, where they abound (Burnet 47); the oyster along gulf coast (Burnet 51); and the snail (Kelly 164).

Trees.—Pupils in this grade should know by name all common plants of the district; continue observing all varieties of trees in the vicinity of the school; give credit to pupils that observe characteristics heretofore not noticed; ascertain how many trees of a certain kind under study are to be found within a given distance from the schoolhouse; take sense of pupils on most beautiful tree around the school; what patrons of the school are planters of trees? Compare growth of trees in forest and in open ground; observe process of natural pruning; purpose of pruning; method of artificial pruning of shade trees, fruit trees, grape vines, etc. (F. B. No. 180). Lead pupils, and patrons through pupils and arbor day exercises, to plant shade and fruit trees on the home grounds, and shade trees along public roads. (F. B. Nos. 134, 154, 185).

Flowers.—Study the flowers grown in school and home gardens; the daisy, aster, carnation, pink, chrysanthemum, poppy, heliotrope, geraniums. Learn parts of flowers; stigma, ovary, anther, sepals, petals; function of each (Burkett, Stevens and Hill, 44). Extend the study of pollination; different provisions for, self-pollination; different provisions for, such as wind, bees, butterflies; nature's method of preventing self-polliuation or in-breeding; developmeut of stamen and pistil at different times, as in common sage and fireweed (Dana 227); inaccessibility of pollen to stigma, as in the iris; monoecious plants, on which staminate and pistillate flowers occur separately as in the oak, pine, hickory, and corn; dioecious plants, where the sterile and fertile flowers are borne on different plants, as in the willow, sassafras, and black gum. Find fertile and sterile flowers on garden plants, such as melon, cucumber, cashaw, pumpkin, squash, etc. (Dana 196-202; Burkett, Stevens and Hill 48 to 53). Study different natural and artificial methods of propagating plants; by seed as in cabbage and corn; spores, as in mushrooms; rootstocks as in Johnson grass; stolons or runners as in strawberry; bulbs and corms as in lily, onion and caladium; cuttings as in the grape, willow, hydrangea; leaf-cutting as in geraniums and begonias; tuber as in Irish potato; layering as in vines; and grafting and budding. (F. B. No. 157; Burkett, Stevens and Hill 54, 83; Hodge 155). Continue study of wild plants and weeds (Burkett, Stevens and Hill 73); method of controlling (F. B. No. 28); poisonous weeds and plants (Hodge 118; F. B. No. 86). Study wild and cultivated vines; find names of all varieties from farmers in neighborhood; plant selected ones on school grounds and home grounds.

School Garden.—Cauliflower in early fall; also celery; study method of culture. Set out eggplants from box in class room in latter part of March in central part of State. Plant butterbeans, lima beans after frost in spring. Grow a few plants of the common sale and feed crops: cotton, cane, sorghum, teosinte, millet, cowpeas, and peanuts, (F. B. Nos. 47, 25, 36, 209, 246, 58, 147, 102). Make simple experiments in fertilization, using wood ashes, cottonseed meal, barnyard manure. Note growth of above crops carefully: sprouting of sorghum and teosinte after cutting; of cane from stubbles left by pupils last year; development of peanut from flower; work of boll weevils; uses of several crops. Grow the plants and flowers for use of this grade.

METHOD OF TEACHING NATURE STUDY.

1. General Statement.—The success of the instruction in any subject is very largely determined by the method employed by the teacher. In nature study the work should grow out of the experiences of the child, and should lead to a systematic broadening of such experiences. This requires that the teacher should ascertain what the child really knows about the topic under study, and then determine what further knowledge is to be taught. The teacher must, then, know the subject and proceed after a definite plan. Both the class-room instruction and the observations made on excursions and at other times by teacher and pupil, should result in the development of that sympathetic relation to, and appreciation of, nature which is the chief end of nature study. The excursion to field, forest, pasture land, garden, brook, hill and valley, is essential. The class-room instruction follows to broaden, fix, and correlate the child's knowledge derived from observation.

2. The Teacher.—The method employed in nature study is determined by the teacher. Her knowledge of the subject, her interest, diligence, zeal, study and attitude—these are the factors that control. Many teachers are deterred from undertaking nature study through a sense of ignorance of the subject; yet, every teacher has a fund of information on animate and inani-

mate nature sufficient to begin teaching the subject, if the work is undertaken zealously. The knowledge that all adults possess of trees, flowers, crops, weeds, domestic and wild animals, the weather, the heavens and the land, may well form the basis of a larger superstructure built by the teacher as she studies and teaches nature.

A first step, then, for the teacher is to add to her knowledge of common things, and this she can best do by study, conversation and observation. Under "Equipment," many valuable books are listed. A few well selected books on nature and nature study should be on the study table of every teacher of the subject. Among these, in order of preference, may be here mentioned the following:

Hodge's Nature Study and Life.
Holtz's Nature Study.
Scott's Nature Study and the Child.
Flagg's A Year Among the Trees.
Weed's Life Histories of American Insects.
Lange's Our Native Birds.

Another source of information, frequently overlooked, but by no means insignificant, is our farmer friend. From him the inquiring teacher may gather a knowledge of trees, crops, field operations, habits of animals, insects, birds and flowers. Such information may be had for the asking, and will often be found as surprising as it is valuable.

But, the best means at hand for gaining such a knowledge of nature as the teacher requires lies in one's senses. The hawk-moth flying from flower to flower at dusk or at dawn should not escape the teacher's watchful eye; her ear should be trained to note the songs of birds, the chirping of crickets, the music of the toad, the call of animals; and her sense of smell to discover the fragrance of fruit and flower.

There is no subject more generally interesting than nature study. The native interest of the child in the things of nature can be stimulated and efficiently directed through an enthusiastic and intelligent interest on the part of the teacher. Every honest inquiry, as the expression of an interest in the pupil, should receive careful consideration. It will often happen that the teacher is unable to answer the question asked, and nothing should lead her to dissimulate; but, an honest effort by teacher and pupil should be made to discover the correct answer. Such effort will always lead to increased interest as well as to a broadening of knowledge.

Above all, the teacher's attitude toward nature and nature study should be right. A broad sympathy with the natural world should be felt; a spirit of intelligent inquiry into nature and her laws should be manifest; an appreciation of the beautiful in song, flower, bird, butterfly and sky, should exist.

3. Plan of Work.—All nature study should be systematic. This requires that the teacher adopt a definite plan for the year's work, and in some cases for certain parts of the work of several terms. In planning the term's work, consideration should be given to the study of the preceding year and to the subject matter of subsequent years.

The following brief plan for the study of the hickory tree is offered as a suggestion:

October.—Excursion to the woods: observation of trunks, limbs, bark, nuts, color of falling leaves; appreciation of trees. Collecting leaves and nuts for the cabinets; study of uses of nuts as animal food; attacks by weevils, etc.

January.—Appearance of tree when shorn of leaves; classroom study; uses of wood; preparation for bud study. Planting hickory nuts to grow trees for school grounds; planting young trees.

March.—Study of hickory buds (March 1st to 20th in center of State); date of opening of first bud; color of first leaves; compare unfolding of hickory buds with those of other trees; watch closely for the flowers.

Correlation. With language, composition, drawing, numbers, during the term.

The study of the oak family may extend over several years and should be planned accordingly. The work may begin with the white or red oak in the second grade. The more common and distinctive types may be studied as a family in the third or fourth grade, largely with a view to knowing the trees by their bark, leaf or acorn; during subsequent years the child's knowledge should be extended to cover every variety of oak growing in the district.

In order that the nature study period may be used most profitably, the work should be planned in advance. This gives the teacher time for thorough preparation and observation. The tree, flower, insect or fish has been located, and the work is undertaken with more interest.

4. The Excursion.—"It is always desirable to have the pupils feel that the nature study work lies out of doors rather than indoors. The work is brought inside only when it can be better done in the school house. The excursion, therefore, becomes a very important part of nature study work. However, the general promiscuous excursion-going may be too indefinite and discursive to be anything more than a recreation; therefore, the excursion should be planned for some definite object. Tell the pupils the general line of inquiry they are to make—to see a maple tree, to watch the fish in the brook, to examine the lichens on the rocks, to discuss the weeds in a fence corner, to watch the cows feeding, to discover the habits of a particular bird. Make the excursion short, definite and for a purpose."

Nothing can take the place of the school or class excursion. To develop a sympathy with nature requires that the child shall observe her works in field, forest and garden, on farm, hill and stream (Dana 257-265).

Mere object lesson in the class-room will not suffice. The chief factor in the excursion should be observation, detailed and accurate. The child should not only see that the tomato worm eats the leaf of the plant, but should discover how it eats; he should not only see the unfolding buds of a tree from a distance, but should observe them closely, note their parts, and manner of development. Yet, accuracy does not mean completeness; the study of a leaf may be accurate and complete as to one purpose and yet leave out of consideration lobing, veins, arrangement, adjustment and transformation; the formation of dew may be observed as to time, place and condition, yet the principle of condensation may be deferred for later study. (Holtz p. 48.)

5. Class-Room Work.—Part of the work in nature study can be better done indoors than out of doors. In all cases, however, where this is done the natural environment of the object under study should be observed by teacher and pupil, and the class-room study adapted to such environment. When studying buds, for example, the excursion should first reveal these as essential parts

of growing plants. Detailed study may then be done indoors. Object-study which takes the object out of its natural environment and fails to establish the relation of the part to the whole in nature, is not nature study; butterflies and moths, wild and cultivated flowers, buds and leaves, when gathered by the teacher for class-room study, do not make nature study; but when these have been observed by the child in their natural surroundings and relations and brought into the class-room, they may well form the subject of more detailed study of the best kind.

Following are some phases of indoor work in nature study:

a. Rearing of insects in the vivarium (silkworm, cabbage butterfly, mosquito, frog.)

b. Observation of life habits, growth, food, etc., of animals (cat, canary, toad, turtle, spiders, earthworms, bat, goldfish).

c. Growth of indoor plants (ferns, begonias, palms).

d. Germination of seed and growth of young plants (bean, radish, corn, eggplant, tomato, cabbage).

e. Study of buds, fruits (seed), leaves, flowers, barks; gathered by the class and stored in herbarium or cabinet.

f. Mounting insects collected by pupils. (Hodge p. 45).

g. Experiments to illustrate physical phenomena.

6. Garden Work.—This work should be planned for each grade as to correlate in an effective manner with the nature study. If bulb plants and vines are to be studied in the third grade the pupils, groups, or class should grow such plants in the school or home garden as will best serve the purpose in view. The work of the garden should be planned in advance, the plants to be grown by the grade or school determined beforehand, the seed provided before planting time, the beds marked out, the soil prepared, and the time of planting fixed upon, after consulting local gardeners and seed catalogs adapted to Louisiana.

In some schools, as at Tallulah, competitive designs of the garden or beds are made by pupils and classes, and the plans selected are followed in the work of the session. In others, as at Bunkie, the garden is divided into class plots and individual beds. On the former the class plants and cultivates the typical vegetables and flowers to be studied during the year; on the latter, other crops are grown for which the individual has a special fondness.

In any school garden work special emphasis should be given to the factors of ownership, responsibility and interest. These are the best agencies for eliminating drudgery. The plant that the child owns and for which he is responsible can never fail to interest him. This is true for vegetables and flowers, which are short-lived; it should be made doubly true for the oak tree grown from an acorn planted years ago and set out by the pupil's own hands.

The value of this sense of proprietorship and responsibility suggests the importance of home gardening as a factor in the success of the school garden and of nature study. Every child should be led to plant his own seeds on his own bed in the home garden. Such a plan will replace the drudgery of present home garden work with interest and pleasure.

In connection with the home and school garden work the need and importance of community co-operation should be taught. Today this is best illustrated in Louisiana by the united opposition offered by our farmers to the depradations of the boll weevil. The success of the fight demands that each farmer shall do his part; and he who fails in this works an injury to his neighbor as well as himself. Thus may be taught the brotherhood of men, the dependence of the individual upon the community and of the community upon the individual.

Successful school gardening requires that the teacher should know the theory and art of horticulture at least in an elementary way. This means that she must be observant and studious. A few references are given of valuable treatises on the school garden:

Hodge's Nature Study and Life. Chapter 8.
Holtz's Nature Study. Chapter 16.
Kern's Among Country Schools. Chapter IV.
Hemenway's How to Hake School Gardens. Chapter . .
The School Garden, Farmers' Bulletin No. 218.

7. Study.—Both the teacher and the pupil should be diligent in extending their knowledge of nature by study as well as by observation. A vast fund of knowledge is gathered today in attractive books, the study of which is a source of pleasure. In this as in other successful school work, the teacher must anticipate the needs of the pupil. A given topic is to be studied in

November; the teacher has looked through her reference books for material; she has made a memorandum in her nature study note book of valuable selections or chapters; perhaps she has found appropriate nature myths. When the subject is presented for class study the teacher already feels a vital interest in it; suitable selections are read to the pupils; other references are placed on the board; and the work of the pupils is carefully guided and supervised from day to day. (Holtz, p. 24).

Nature myth should form a part of the work in all the grades, but especially in the lower ones. They appeal to the child's imagination and are a source of pleasure to him, add interest in the subject under study, and yield valuable material for language work. See Cooke's Nature Myths; Holbrook's The Book of Nature Myths; Wilson's Nature Study in Elementary Grades; Kingsley's Water Babies.

Each pupil should be required to keep a note book in which to record the results of his observations and study of the natural world. The extent and kind of record will vary with the grade. Essentials only should be required: time of opening of tree buds in early spring; date of finding first wild violet; drawings of leaf, fruit and insect; perhaps water color sketch of flowers; record of life history of the mosquito, frog, or butterfly; daily temperature records for a month, etc.

8. Correlation.—Nature study can and should be effectively correlated with language, composition, number work, history, geography and civics; it should also lead directly to and form the basis for the study of agriculture and the other sciences.

In the oral language of the lower grades the material of the nature study lesson may well serve as the basis of instruction. If the nature study has led the child to learn new facts and has developed an interest in the object studied, he will be anxious to express such knowledge. The tactful teacher will be quick to turn to good account such disposition in her pupil. In number work many problems in the four fundamental operations, fractions, percentage and measurement, may be based upon the experiences centering around the school garden. The role of certain crops, as tobacco, wheat and cotton may be pointed out in the historical development of our country; the great industries dependent upon our fields and forest should form interesting chapters in geography;

the duties of the citizen to the community in such matters as the extermination or control of insect pests and weeds, respect of the property rights of others, united efforts for the preservation of our natural resources, may all spring out of the work in nature study. (Holtz, Chapter VI.)

MATERIAL EQUIPMENT FOR NATURE STUDY.

Present day teaching of any subject requires a certain equipment in a material way. This is particularly true of the sciences and industrial subjects. Here tools and apparatus are required as well as textbook, wherein the accumulated experiences and discoveries of the race are recorded in systematic form.

The suggestions here given for material equipment for the work in nature study, school gardening and agriculture, may seem ideal to some teachers, but many of the schools of Louisiana have, in full or in part, the appliances, apparatus, tools, textbooks and other publications, and the general equipment recommended.

1. Books.—Every teacher of nature study, school gardening and agriculture should have access to certain textbooks and general treatises on these subjects. Few of us, even among those who have studied these subjects in the high school, normal school or college, know them so thoroughly as not to have to be on the alert at all times to enlarge our knowledge; and no teacher who wants to grow in these subjects and to become more efficient in the class-room and school garden and on school excursions, can afford to disregard books as ready sources of information.

Such books may be the personal property of the teacher (and she can make no better investment in Louisiana today than in many well selected books), or may be part of the school library. A first step, then, in many schools will be to add to the library, if it already exists, such books found in the list given below as may not already be in the library; or if there is no library in the school, a liberal portion of these books should be included when the library is ordered.

Nearly all the books given below are found in the adopted list or on the library list. The author of each book is given in parenthesis, and reference in the course of study is made to the book by using the author's name. For fuller list of reference books, see Holtz's Nature Study, appendix.

BOOKS ON NATURE STUDY—FOR TEACHERS.

Nature Study (Holtz), Charles Scribner's Sons.

Nature Study and Life (Hodge), Ginn & Co.

Nature Study and the Child (Scott), D. C. Heath & Co.

Special Method in Elementary Science (McMurray), the Macmillan Co.

Real Things in Nature (Holden), Macmillan Co.

Manual for the Study of Insects (Comstock).

Nature Study Idea (Bailey), Doubleday, Page & Co.

A Year Among the Trees (Flagg), Ed Pub. Co.

Life Histories of American Insects (Weed).

The Woodpeckers (Eckstrom), Houghton, Mifflin & Co.

Our Native Birds (Lange), Macmillan Co.

Birds of the United States (Nutall), Little Brown & Co.

FOR PUPILS.

Plants and their Children (Dana), American Book Co.

Nature Study in Elementary Schools, First Reader (Wilson 1), Macmillan Co.

Nature Study in Elementary Schools, Second Reader, Myths, Stories and Poems (Wilson 2).

Nature Myths (Cooke), A. Flanagan & Co.

Language Through Nature, Literature and Art (Perdue-Griswold), Rand, McNally & Co.

Insect Folk (Morley), Ginn & Co.

All the Year Round, Autumn, Winter, Spring and Summer (Strong), Ginn & Co. (4 vols.)

Pets and Companions (Stickney), Ginn & Co.

Seaside and Wayside (Wright).

Buds, Stems and Roots (Chase 1), Field and Forest Series. Educational Publishing Co.

Some of Our Wild Friends (Chase 2), Educational Publishing Co.

Animals, Wild and Tame (Chase 3), Educational Publishing Co.

Stories from Garden and Field (Chase 4), Educational Publishing Co.

Leaves and Flowers (Spear).

The Life of a Bean (Laing), D. C. Heath & Co.

Stories Mother Nature Told Her Children (Andrews).

Some Insect Enemies of Garden Crops (Smith), Bulletin 197, Agricultural College, West Raleigh, N. C.

Friends in Feather and Fur (Johonnot).

Short Stories of Our Shy Neighbors (Kelly), American Book Co.

Secrets of the Woods (Long), Ginn & Co.

Stories of Animal Life (Holder), American Book Co.

Sharp Eyes (Gibson.)

Animals I Have Known (Thompson-Seton 1).

Lobo, Rag and Vixen (Thompson-Seton 2).

How to Make School Gardens (Hemenway), Doubleday, Page & Co.

Ten Common Trees (Stokes), American Book Co.

Stories of Birdland (Chase 4), Educational Publishing Co.

Our Birds and Their Nestlings (Walker), American Book Co.

Bird Magazine, C. K. Reed, Worcester, Mass.

Educational Leaflets, National Association of Audubon Societies, 525 Manhattan Ave., New York.

Nature Study Leaflets, Cornell University, Ithaca, N. Y.

Directions for Collecting and Preserving Insects (Riley), Smithsonian Institute.

Agriculture for Beginners (Burkett, Stevens and Hill), Ginn & Co.

Color Prints of Birds by Cosmos Co., Brown & Co., and Perry Pictures Co.

2. Publications.—Under this heading are included the publications of the National Department of Agriculture, the Experiment Stations and educational institutions. Of the first named, every teacher should have the most recent issues of "Publications for Free Distribution," the "List of Publications, for Sale," and "Farmers' Bulletins Subject Index," all obtainable from the Department of Agriculture, Washington, D. C.

A few only of the more important publications of the Department of Agriculture can here be given:

Forestry in the Public Schools (Pinchot 1). This is Circular 130, Forest Service. It contains a discussion on correlation of forestry with other subjects, and an appendix giving an extensive list of forestry publications.

A Primer of Forestry (Pinchot 2).

Yearbooks of the Department of Agriculture and Reprints.

Farmers' Bulletins. These are not all listed separately, but are referred to by number as (F. B. No. ....) and are all obtainable free from the Department of Agriculture.

The School Garden (F. B. No. 218).

School Gardens (Galloway) Bulletin No. 160, office of Experiment Station.

Propagation of Plants (F. B. No. 157).

Tree Planting on Rural School Grounds (F. B. No. 134).

The Vegetable Garden (F. B. No. 94.)

Beautifying the Home Grounds (F. B. No. 185).

Annual Flowering Plants (F. B. No. 195).

Weeds (F. B. No. 28).

Some Common Birds (F. B. No. 54).

Four Common Birds of Farm and Garden (Reprint 1895 Yearbook).

Weather Bureau in the Public Schools (Reprint 1907 Yearbook).

Seed Catalogs.—These are indispensible for school gardening. The best adapted to Louisiana conditions is that of the J. Steckler Seed Co., New Orleans. Besides general directions on gardening and special instruction on the cultivation of different garden crops, it gives a list of vegetables to be planted each month in the year. Other houses issuing valuable catalogs are:

J. M. Thorburn & Co., 33 Barclay St., New York City.

Otto Schwill & Co., 20 S. Front Street, Memphis, Tenn.

T. W. Wood & Sons, 12 S. 14th St., Richmond, Va.

Texas Seed and Floral Co., Dallas, Texas.

W. Atlee Burpee & Co., Philadelphia.

Vaughan's Seed Store, 84 Randolph St., Chicago.

Metairie Ridge Nursery Co., 141 Carondelet St., New Orleans, La. (flowers, trees and shrubs.)

3. Apparatus.—References are here given, as far as possible, of sources of information relative to the apparatus required.

Insect net (Hodge p. 50; Riley p. 27).
Poison bottle (Hodge p. 52; Riley p. 63).
Chloroform bottle (Riley p. 62).
Insect cage (Burkett, Stevens and Hill, 126).
Mounting cabinets (Hodge p. 53).
Aquaria (Hodge p. 393).
Earthenware pots, jars, bottles.
Florence flask, beakers, test tubes, alcohol lamp.
Boxes with glass covers.
Magnet, magnetic, compass, spring balances.
Glass case for nature specimens.
Thermometer, barometer, glass prism.
Magnifying glass or microscope.

4. Museum.—Mounted specimens of typical insects, bugs, crustaceans, birds, etc.

Herbarium, with pressed specimens of important plants, leaves, stems and flowers.

Specimens of leaves, barks, roots, stems, buds and seed (fruit). Latter should include common seeds of field, garden and forest; also such as are specially adapted for dispersal: barbed seed (cockle bur and beggar tick); flying seed (maple and ash); winged seed (thistle, dandelion, golden rod); shooting seed (boxes), as the pansy, violet and poppy.

Rocks, pebbles, soils.

5. Tools.—The school garden work requires that each pupil or group have access to the following tools:

Spading fork, hoe (6in.), rake and hand weeder.

The school should have, beside, for each eight to twelve pupils the following: spade, sprinkler and garden plow (Planet Jr. No. 16).

6. Land.—The extent of the school lot will determine the size of the school garden, which should not encroach upon the necessary play grounds. This, however, does not mean that all of a one-acre lot should be used for baseball.

Reports from parish superintendents were made on 578 school lots. Of these there are 19 with more than 3 acres; 56 from 2 and 3 acres; 16 from 1½ to 2 acres; 246 from 1 to 1½ acres; 67 from ½ to 1 acre; leaving 174 school sites with less than ½ acre. If these schools represent the average in Louisiana, then 42 per cent of our schools have grounds of less than 1 acre, and 42 per cent have grounds of about 1 acre in extent. This leaves but 16 per cent with more than an acre of land.

This study suggests the need of a movement in Louisiana for larger school grounds. The opinion of this committee is that no rural school should have grounds less than 2 acres in area. Such a lot gives space for play grounds for girls and boys separately, for flower beds, school garden, walks, shrubs and trees.

The school garden may occupy from ⅛ to ¼ acre, according to the number of pupils in the school. Where the grounds contain one acre or less the school garden may be reduced proportionally. A space 20x40 feet will do well for a school of 20 pupils, allowing to each group of two a bed of 8 feet square. In graded schools with two or three teachers and 60 to 100 pupils, a quarter acre garden gives each pupil a bed 10 feet square; if the school is grouped by twos, one-eighth acre is sufficent. In the larger town schools where all pupils work in the garden, more space should be given to the garden. Where the school is large and the grounds small, it may be necessary to allot a bed to each grade only, say 10x20 feet, or 10x40 feet.

Along with the agitation of the question of larger school grounds, should come that of fencing such grounds. Of the 578 schools reported upon only 122 are fenced. It is needless to say that such schools can have neither trees, shrubs, flowers nor school gardens, unless special provision is made for protecting every plant that is set out. In a few instances it may be deemed wise not to fence the school grounds. Here the school garden would still require a fence. Where the grounds are suitably fenced, it is doubtful whether the school proper should have a special enclosure. It should be possible readily to develop sufficent self-control and respect for the rights of others to safeguard the garden beds.

The site of the garden should be carefully considered. Shaded spots should be avoided, and special regard had to drainage. Ordinarily, the garden should not be near the front or by the public road. Some successful school gardens in Louisiana are on private lands near the school, e. g. the Roseland garden, Tangipahoa Parish. In some schools the garden beds are laid around the edge of the lot. In such cases the trees have been planted twenty feet from the fence, in respect probably to the adjoining fields.

COURSE IN AGRICULTURE—SIXTH GRADE.

SOIL AND WATER.

Soil.—Origin, kind, preparation and cultivation, deterioration, improvement, manuring, mineral plant food.

Water.—Moisture in soil, drainage, capillarity.

PLANTS.

Flower.—Parts, functions, pollination, crosses and hybrids.

Seed.—Germination, purity, vitality, selection.

Roots.—Kinds, root hairs, function, tubercles, relation to tilage.

Leaves.—Variety, parks, function.

Propagation.—Seed, tubers, bulbs, layering, cuttings, budding, grafting.

Crops.—Corn, seed selection, planting, growing, harvesting, storing.

ANIMALS.

Insects.—Structure, classification, habits, life changes and control of types of common orchard, garden and field insects.

Domestic Animals.—Horse, habits, breeds, characteristics of; balanced ration in feeding.

SEVENTH GRADE.

FARM CROPS

Cotton, cane, rice, peanuts, onions, Irish and sweet potatoes, cultivation, fertilization, seed selection, rotation.

FORAGE CROPS.

Cowpeas, oats, sorghum, teosinte, kaffir corn, alfalfa, lezpedeza, grasses.

GARDEN CROPS.

Common vegetables, hotbeds, coldframes, sowing, care of crops.

HOME GROUNDS.

Flower gardening, pot plants, tree planting.

ANIMALS.

Cattle, sheep, swine, poultry, birds, honeybee.

OPERATIONS, ETC.

Dairying, marketing, feeding, crop diversification; products for home consumption; tools and implements; improving country life; a country beautiful.

The committee has not deemed it necessary to prepare the course of agriculture in greater detail than is given above. The adopted text for the grammar grades (Agriculture for Beginners, by Burkett, Stevens and Hill), is a sufficent guide to the teacher of the subject. The following publications of the U. S. Department of Agriculture, office of Experiment Stations, will be found helpful in this work:

1. Simple Exercises Illustrating Some Applications of Chemistry to Agriculture (Hatch), Bulletin 195.
2. Exercises in Elementary Agriculture—Plant Production (Crosby), Bulletin 186.
3. The Teaching of Agriculture in the Rural Common Schools (True), Circular No. 60.
4. Use of Illustrative Material in Teaching Agriculture in Rural Schools (Crosby).

9. Agricultural Clubs.—The organization of agricultural clubs among the boys of the public schools in Louisiana is, in the opinion of the committee, a work that merits the attention of both teachers and superintendents. As an adjunct to the work of class room and school garden, such clubs have been found most helpful. Beginning ordinarily with one crop, such as corn, the interest of the boys has extended to all other important crops. Thus a broad general interest has been developed in the whole subject of agriculture through these clubs.

Aside, however, from exercising a good influence upon the teaching of agriculture in the common schools, the boys' clubs have been found to be strong agencies in leading ambitious members to remain in school after completing the grammar grades and continue their studies in the high school. In certain states, e. g. Illinois, the boys' experiment clubs have served to direct the attention of the youth to the university of that state, and the work it is doing for the farmer. Many of the boys, through the means of the clubs, have been able to attend the Agricultural College and pursue courses in corn and stock judging, etc. (Reprint 1904 Yearbook: Boys' Agricultural Clubs.)

During the year 1908 corn clubs were organized in several parishes of the state, notably Avoyelles, Washington, Assumption and others. So successful were these clubs in the development of interest in agriculture on the part of pupil and parent and in helping the general school work, that many additional clubs have been organized during the first three months of this year. The movement is one that commends itself to progressive school teachers and superintendents.

THE QUALIFICATIONS OF TEACHERS.

Only 10 per cent of the teachers in the 16 parishes reporting have taken a course in nature study in a normal college, 4 per cent have studied agriculture. In the summer school 15 per cent have studied nature study and 10 per cent agriculture; 80 per cent of the teachers have had no school education in nature study and 88 per cent have had no education in agriculture. This lack of school education in these subjects may be, to a small extent, counterbalanced by the fact that 68 per cent of the teachers were reared on farms. However, in the judgment of the superintendents, but 22 per cent of the teachers are qualified to teach nature study, 14 per cent to teach agriculture and 8 per cent to teach the elements of forestry.

This lack of preparation on the part of the teachers is not peculiar to Louisiana, it is everywhere the greatest obstacle to the successful teaching of nature study and agriculture. The teachers are not to be blamed for their failing to have qualified in these subjects for opportunity has not been offered, nor has there been an authoritative demand that they should qualify in these subjects.

Normal schools are just beginning to offer courses in these subjects. Out of 50 courses of study in state normal school, but two in 1895 offered nature study, and not one had a course in agriculture, so recently as 1905, but nine of these schools had a course called nature study and but six had introduced courses in agriculture.

It would seem that the impossible has been expected of the rural teacher in requiring her to teach subjects in which she has had little or no education. It is evident that until teachers can be better prepared little effective work can be done in these subjects. It is further evident that the opportunities for teachers to qualify to teach these subjects is one of the most urgent needs. Courses in nature study and agriculture in our summer schools which the rural teachers shall be required to take, is the almost unanimous recommendation of the parish superintendents for qualifying teachers in these subjects. After this comes the recommendations to have these courses included in the course of all schools in the state preparing elementary teachers.

The committee would recommend that the State Institute Board should have courses in the teaching of nature study and agriculture offered in all the state summer schools. It would further recommend that both these subjects be added to the certificate requirements after July 1, 1911.

Dr. Bailey in his monograph referred to in the earlier pages of this report, has made an extended presentation of the facts concerning the training of teacher in nature study and agriculture. Those who wish fuller information on this general topic than is here given are referred to Dr. Bailey's monograph. The following is the outline of his discussion of the subject:

1. Aids to teachers already in service.
(a Summer Schools.
(b) Regular Teachers' Institutes.
(c) Lectures.
(d) Correspondence and leaflet work.
(e) Short courses in Agricultural Colleges.
(d) Correspondence and Leaflet Work.
(f) Peripatetic Teachers.
(g) United States Department of Agriculture.
2. The training of new teachers:
(a) State Normal Schools.
(b) Local Normal Schools.
(c) High Schools and Training Classes.
(d) Separate Agricultural Schools.
(e) Special Foundations.
(f) Educational Departments and Teachers' Colleges.
(g) Colleges of Agriculture.

THE TEACHING OF AGRICULTURE IN HIGH SCHOOLS.

The question of successful teaching of the agricultural sciences in the high school involves a study of the courses of study of the higher institutions of the country offering agricultural courses as well as a study of the provisions made for the establishment and maintenance of such institutions. To ascertain what each state is doing to aid and encourage instruction in agriculture in universities, colleges, and high schools, the subcommittee having in charge the investigation of "The Teaching of Agriculture in the High Schools" sent the following questionnaire to the superintendents of public education in every state and territory in the Union:

1. How many A. & M. colleges in your State?
2. What laws govern the establishment and maintenance of them?
3. How many agricultural high schools or agricultural schools in your State?
4. Are such schools essentially rural?
5. What laws and regulations govern these schools?
6. Kindly send courses of study.
7. What State requirements have you for determining the academic and professional training of teachers in these schools?
8. What are the requirements for admission to these schools?
9. What are the requirements for graduation?
10. How many graduated from these schools last year?
11. What pursuits do graduates from these schools usually follow?
12. What was the total attendance in such schools last year?
13. Do these schools meet the demand of those patronizing them?
14. If so, has the demand for agricultural schools increased?
15. Has the establishment of these schools tended to increase or decrease the attendance in your other high schools?
16. Would you advise the establishment of agricultural high schools or the introduction of agricultural courses in high schools?

At the same time a questionnaire was sent to every higher institution in the country offering courses in agriculture. After the reports of the various state superintendents had been received, copies of the same questionnaire were sent to one or more of the agricultural high schools in each state reported by state superintendents.

Dear Sir:

I shall be under many obligations to you if you will furnish this Department, at a very early date, with the information asked for below:

1. What laws govern the establishment and maintenance of your institution?
2. What is the standard to admission to your institution?
3. What is the standard of graduation from your institution?
4. Please send your latest catalogue.
5. How many students have you following exclusively the agricultural course?
6. How many of these students graduate every year?
7. What vocations do they usually follow after graduation?
8. What per cent. teach in the agricultural high schools?
9. What is usually paid for such trained teachers?
10. Is there an increase in demand for such teachers?
11. What has been the percentage of increase in attendance to your agricultural courses in the last five years?
12. To what do you attribute this increase?

Thanking you again for this information, I beg to remain,

Yours very truly,

T. H. HARRIS,
State Superintendent.

State Superintendent Harris gave the Committee permission to use his official title and the letter-heads of the State Department of Education in sending out the questionnaires referred to. In this manner, more accurate and fuller replies were received than it would have been possible to obtain without such aid. With the exception of a single state, replies were received from every state and territory in the Union. Forty colleges and universities offering courses in agriculture answered the questions. Agricultural courses for high schools were submitted by Alabama, Wisconsin, Indiana, Georgia, Maryland, Michigan, Minnesota, and New Hampshire. In addition to these reports, the United States Department of Agriculture furnished a large amount of literature. The Committee herewith acknowledges its indebtedness to Mr. D. J. Crosby of the United States Agricultural Department, to all of the state superintendents and to the heads of agricultural colleges and agricultural high schools.

NATIONAL SUPPORT FOR A. & M. COLLEGES

Sixty-two state colleges offering courses in agriculture and the various experiment stations are receiving support from the National Government, the first grant being made in 1862. In addition to these grants the various states in which such colleges and experiment stations are located have supplemented the grants of the National Government.

The Morill Act of 1862 provides as follows:

"Act of 1862 Donating Lands for Agricultural Colleges.
(First Morrill Act.)

"An Act Donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanical arts.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be granted to the several States, for the purpose herinafter mentioned, an amount of public land, to be apportioned to each State a quantity equal to thirty thousand acres for each Senator and Representative in Congress to which the States are respectively entitled by the apportionment under the census of eighteen hundred and sixty: Provided, That no mineral lands shall be selected or purchased under the provisions of this act.

"Sec. 4. That all moneys derived from the sale of the lands aforesaid by the States to which the lands are apportioned, and from the sales from land scrip hereinbefore provided for, shall be invested in stocks of the United States, or of the States, or some other safe stocks, yielding not less than five per centum upon the par value of said stocks; and that the moneys so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in section fifth of this act), and the interest of which shall be inviolably appropriated, by each State which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislature of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

The Hatch Act, approved in 1887, appropriates $15,000 annually for experiment stations.

(HATCH ACT.)

"An Act to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July second, eighteen hundred and sixty-two, and of the acts supplementary thereto.

"Be it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled, That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science, there shall be established under direction of the colleges or agricultural department of the colleges in each State or Territory established, or which may hereafter be established, in accordance with the provisions of an act approved July second, eighteen hundred and sixty-two, entitled "An act approved July second, eighteen hundred and sixty-two, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," or any of the supplements to said act, a department to be known and designted as an "agricultural experiment station." Provided, That in any State or Territory in which two such colleges have been or may be so established the appropriation hereinafter made to such State or Territory shall be equally divided between such colleges, unless the legislature of such State or Territory shall otherwise direct.

"Sec. 5. That for the purpose of paying the necessary expenses of conducting investigations and experiments and printing and distributing the results as hereinbefore prescribed, the sum of fifteen thousand dollars per annum is hereby appropriated to each State, to be specially provided for by Congress in the appropriations from year to year, and to each territory entitled under the provisions of section eight of this act, out of any money in the Treasury proceeding from the sales of public lands, to be paid in equal quarterly payments on the first day of January, April and October, in each year, to the treasurer or other officer duly appointed by the governing boards of said colleges to receive the same."

The second Morrill Act of 1890 apropriated $25,000 annually for maintenance of agricultural colleges.

ACT OF 1890 FOR THE FURTHER ENDOWMENT OF AGRICULTURAL COLLGEES.

(Second Morrill Act.)

"An Act To apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress, approved July second, eighteen hundred and sixty-two.

"Be it enacted by the Senate and the House of Representatives of the United States of America, in Congress assembled, That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each State and Territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established, or which may be hereafter established, in accordance with an act of Congress approved July second, eighteen hundred and sixty-two, the sum of fifteen thousand dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of one thousand dollars over the preceding year, and the annual amount to be paid thereafter to each State and Territory shall be twenty-five thousand dollars, to be applied only to the instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic science, with special reference to their applications in the industries of life and to the facilities for such instruction."

The Adams Act of 1906 provides for increased appropriation for agricultural experiment stations.

(ADAMS ACT)

"An Act To provide for an increased annual appropriation for agricultural experiment stations and regulating the expenditure thereof

"Be it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled, That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, to be paid as hereinafter provided to each State and Territory, for the more complete endowment and maintenance of agricultural experiment stations now established or which may hereafter be established in accordance with the act of Congress, approved March second, eighteen hundred and eighty-seven, the sum of five thousand dollars in addition to the sum named in said act for the year ending June thirtieth, nineteen hundred and six, and an annual increase of the amount of such appropriation thereafter for five years by an additional sum of two thousand dollars over the preceding year, and the annual amount to be paid thereafter to each State and Territory shall be thirty thousand dollars, to be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective State and Territories."

The Nelson Amendment, approved in 1907, provides for the further endowment of agricultural colleges:

(Nelson Amendment.)

"That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, to be paid as hereinafter provided, to each State and Territory for the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the act of Congress, approved July second, eighteen hundred and sixty-two, and the act of Congress, approved August thirtieth, eighteen hundred and ninety, the sum of five thousand dollars, in addition to the sums named in the said act, for the fiscal year ending June thirtieth, nineteen hundred and eight, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of five thousand dollars over the preceding year, and the annual sum to be paid thereafter to each State and Territory shall be fifty thousand dollars, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July second, eighteen hundred and sixty-two, and the act of Congress approved August thirtieth, eighteen hundred and ninety."

STANDARDS FOR ADMISSION AND GRADUATION.

The standard for admission to the agricultural and mechanical colleges is graduation from a standard grammar or high school of the state. Such standard varies from state to state with the standard of grammar and high schools accredited by the agricultural college or university. Many of the agricultural and mechanical colleges have preparatory departments to which students are admitted after completing the work of the elementary grades. Besides the regular four-year courses in agriculture offered in a number of institutions, two-year, one-year, special and short winter courses are offered. A number of agricultural colleges have abandoned the preparatory department. The Carnegie Foundation Board has been instrumental in raising the standard of admission to agricultural and mechanical colleges where such institutions have been recognized in the disposition of the Carnegie Pension Fund. Illinois, Purdue, Iowa, Maine, Amherst, Minnesota, Missouri, Nebraska, Montana, and Cornell universities have 15 unit standards of admission to the four-year agricultural course. North Dakota, Pennsylvania State, Texas, and Wisconsin universities require 14 units. Ohio State University, 12 units; Kansas University, 6.6 units; University of California, grammar school education. Other institutions require one, two, and three years high school preparation. It is evident from the examples cited that there is even less uniformity in requirements for admission to agricultural courses in colleges and universities than there is in the general college and university admission requirements.

Standards of graduation from agricultural courses in various institutions vary with the kinds of courses taken and with the standards of admission.

ATTENDANCE IN AGRICULTURAL COURSES AND TEACHERS OF AGRICULTURE AVAILABLE.

Available statistics show that there are approximately 10,000 students of agriculture in this country, including all students in the four-year, two-year, one-year, winter, and special courses. Fewer than one thousand students properly trained in experience and scholarship graduate every year. More than 80% of these return to the farm. Not 1% of these graduates take up the teaching of agriculture in high schools. Many of them enter the service of the National Government and the several states to engage in experimental work. Others accept positions in agricultural and mechanical colleges. Still others take up law, medicine, veterinary surgery, or business.

Heretofore, the demand for teachers of agriculture in high schools has been so insignificant that few of the agricultural and mechanical colleges saw fit to institute training departments for teachers of agriculture. It is true that some normal schools have been doing work along this line, but such efforts have been and are almost entirely along very elementary lines, involving the rudiments of nature study and school gardening. The teacher of the agricultural sciences in the high school needs to have a much broader, deeper, and more scientific training for his work than the normal school is prepared to give. The advancement of high school pupils requires this broader, fuller, and more scientific treatment of agricultural subjects. Besides, the need for making practical applications of the fundamental principles of agriculture is much greater in the high school than in the grades. The possibility of interesting the farmers who patronize the high school is also much greater. Boys may be led by competent teachers who have the necessary training, scholarship, farm-life outlook and interest, to see the significance of practical, scientific agriculture and to have a desire to remain on the farm and make the most of it.

In the last five years the percentage of increase in attendance in the agricultural courses of the A. & M. Coleges has almost tripled, but the demand for agricultural experts is so great that the various institutions can not even meet local and state needs. As an illustration of the case in point, one needs but cite two paragraphs from Crosby's article, "Training Courses for Teachers of Agriculture," Reprint from Yearbook of Department of Agriculture for 1907, pp. 218-219:

"Just now the whole agricultural educational movement is in a condition of rapid though rather chaotic development. The country school appeals to the country normal school and the state normal school for teachers having the country-life outlook; the normal schools supply a few emergency-trained teachers and call upon the agricultural college for expert assistance, and the agricultural college, at the very best, can only go a little way toward supplying the assistance needed. All of these agencies are striving to the utmost to supply properly trained teachers, but their combined efforts do not avail in the present emergency, to say nothing of preparing for future needs.

"The task of preparing teachers for the country schools is an enormous one. Take, for example, the State of Wisconsin, with its agricultural college, 7 State normal schools, and 10 country training schools, all of which are training teachers of elementary agriculture. If from this time on all of the graduates of all of these institutions should engage as teachers in rural elementary schools, it would take seven years at the present rate of graduation to supply each school with one teacher. In 1906 there were 11 graduates from the State college of agriculture, 64 from the State normal schools, and 231 from the country training schools for teachers. It is not likely that any of the graduates from the college of agriculture went into the rural elementary schools, and probably not more than one-third of those from the State normal schools. Assuming that 215 graduates from the State normal schools and 230 from the country training classes went into these schools, it would take at this rate fourteen years to supply one teacher for each of the 6,439 rural elementary schools in the State. Verily, there would not be much danger of an over-supply of trained teachers of elementary agriculture in Wisconsin, if all her

State educational institutions were to devote their energies to this one field of endeavor. And Wisconsin ranks well to the front in facilities for training teachers.

"In the first place, we believe that the main business of the agricultural colleges in this field should be research in agricultural education and the preparation of teachers for the more advanced work in agriculture—*i. e.*, for the colleges, the agricultural high schools, the State normal schools, and the public high schools employing special teachers of agriculture. The agricultural colleges should also coöperate freely with the State normal schools, through interchange of instructors when this is feasible, and in conducting teachers' institutes, summer schools, and extension work among rural schools."

In face of the facts as stated in the foregoing paragraphs and the statements of forty deans of agricultural colleges and universities that they can not supply the demands made upon them, the duty of the State of Louisiana seems clear if competent teachers of agriculture for high schools desiring to inaugurate the agricultural courses are to be provided.

SALARIES PAID TO HIGH SCHOOL TEACHERS OF AGRICULTURE.

Equally as serious as inadequate facilities for training teachers of agriculture is the question of salaries paid to such teachers in agricultural high schools. The average salary paid to teachers of agriculture in high schools is approximately $1,000. Many of the deans of agricultural colleges express the opinion that agricultural high schools can not hope to get competent teachers of agriculture for the salaries paid. Dean H. J. Waters, of the University of Missouri, states that "Perhaps a majority of our graduates at the present time go into professional agriculture, such as the Government service, teaching or investigating, because of the great pressure that is brought to bear upon them to do so on account of the great demand for men in these lines. A goodly number, however, resist this temptation and go back to the farm. *Very few teach agriculture in high schools, for the reasons that positions at better rank and compensation in colleges and the Governmental service are awaiting them.*"

PRESENT FACILITIES FOR TRAINING TEACHERS OF AGRICULTURE.

On account of the demand made upon agricultural and mechanical colleges for the professional training of teachers of agriculture in high schools, many of these institutions are now taking up this feature. Dean Davenport, of the University of Illinois, expresses what is probably the general attitude of A. & M. colleges toward this new demand. He says: "Very few graduates of agricultural courses teach in agricultural high schools. Indeed, we have not until recently given any attention to the training of teachers for this purpose. We are now giving instruction, however, in this direction, and we have some ten or a dozen students preparing for this field."

Several state universities allow credits counting toward a bachelor's degree for teachers' courses in agriculture. The University of Nebraska uses the School of Agriculture as one of the model secondary schools for the Teachers' College, offering training in observation and practice. In addition to the four-year course in agriculture, a special one-year teachers' course in agriculture is provided to prepare teachers for high schools and normal schools.

The University Bulletin states with reference to the function of the Teacher's College connected with the university that—

> "This college is charged with the duty of developing the work of instruction in agricultural pedagogy made possible by the so-called 'Nelson Amendment,' which became law at the end of the Fifty-ninth Congress.
>
> "Men and women of college grade who design to teach agriculture in high or normal schools. For these a solid one-year course is provided, parts of which may, however, under advice, by such as so desire, be used with the more general studies toward a degree."

The University of Missouri makes similar provisions for teachers' training in agriculture.

Arkansas, Illinois, Maine, Mississippi, North Dakota, and Cornell universities are some of the other institutions offering teachers' courses in agriculture. In 1908, according to the statement of Mr. Crosby, summer schools giving courses in agriculture for teachers were announced in the catalogues of the agricultural colleges in California, Connecticutt, Illinois, Kansas, Maine, Massachusetts, Mississippi, Missouri, North Dakota, Ohio, Tennessee, Utah, Washington, and Wisconsin.

Agricultural High Schools

Agricultural high schools are still in their infancy. There are not more than fifty such schools in the whole country. Some of these schools are due almost entirely to local interest. In a few states, agricultural high schools are provided for by state legislation.

Alabama has nine agricultural high schools, one for each congressional district. These are the only so-called state high schools. About 1500 students were enrolled in these schools in 1908. The law enacted in 1906 makes the following provisions:

HIGH SCHOOLS FOR COUNTIES.

HIGH SCHOOL COMMISSION TO LOCATE AND ESTABLISH.—The Governor, Auditor and Superintendent of Education shall constitute a commission to locate one high school in each of the counties of this State; provided, that a high school shall not be established under the provisions of this article in any county in which there is already established an agricultural school, normal school for white people, the Polyclinic Institute, the University of Alabama, the Industrial School for White Girls, or a high school free to all the children of the county, until after a high school has been established in all the other counties.

SITES PROCURED; ANNUAL DONATIONS PAID QUARTERLY.—For any county in which the citizens thereof shall secure a suitable site, which shall consist of not less than five acres of land the title to the surface of which shall be in fee (but the land need not include mineral rights), and erect thereon a good and substantial building with all the necessary equipments for a high school, the cost of said land, building, and equipments to be not less than five thousand dollars, and upon making a deed to the State of Alabama of said land, building, and equipment, there shall be appropriated the sum of two thousand dollars for the payment of teachers in said high school or high schools complying with the provisions of this article, and this appropriation is hereby made to continue annually, the same to be paid quarterly upon warrants drawn by the county board of education in the county in which said high school is located.

HIGH SCHOOLS CONTROLLED BY HIGH SCHOOL COMMISSION AND COUNTY BOARD OF EDUCATION.—Said school or schools as hereinbefore established shall be under the direction and control of the said commission as a board of trustees in connection wtih the board of education in the county in which said high school is located

FREE SCHOOLS AND OFFICE OF TRUSTEE NOT ABOLISHED.—Nothing in this article shall be so construed as to abolish any free school in any district, or the office of trustee in any district in which said high school may be located.

QUALIFICATIONS AND ELIGIBILITY OF TEACHERS AND STUDENTS.—No teacher shall be eligible to teach in any high school established under the provisions of this article, unless holding a first-grade or life certificate. Nor shall any student be eligible to entrance into said high school unless said student can pass a satisfactory examination in the branches of free public instruction in the elementary schools of his or her county. Such schools shall be open to students of the white race, regardless of age, who have complied with the provisions of this section.

COURSE OF STUDY.—A course of study for such schools shall be provided and required by the Superintendent of Eduation; such course of study shall consist of secondary branches of study.

MATRICULATION FEE.—A matriculation fee of one dollar may be charged to each student to defray necessary expenses during each term.

The course of study is arranged to meet the College Entrance Requirements. The sciences are to be given practical application in various phases of farm life. The eighth grade is the first grade in the high school.

In Georgia, an industrial and agricultural school is provided, by a law passed in 1906, for every congressional district in the state.

"Said schools shall be branches of the State College of Agriculture, a department of the University of Georgia. The general board of trustees of the University shall exercise such supervision as in their judgment may be necessary to secure unity of plan and efficiency in said schools.

"Sec. 3. Be it further enacted, That the Governor is authorized and directed to appoint from each county in the respective congressional districts one trustee for the school to be established in such districts; such trustee to hold office for a term of six years from his appointment, and until his successor is appointed, and that the trustee so selected in each district shall constitute a board of trustees for the school in said district, with power to control the management of said school, and make rules and regulations for same, subject to the provisions of this act.

"Sec. 4. Be it further enacted, That the Governor shall be authorized to receive from any county, or any of the citizens thereof, a donation of a tract of land in such county, not less than two hundred acres on which to locate a school with any additional donation in the way of buildings or money; and if there are two or more offers of such donations the Governor, with the aid of the trustees of such school shall select which to accept, taking into consideration the title, value, the centralness of location, accessibility and suitableness in any respect for the purpose intended, and upon the acceptance of any such donation, and the execution of proper deeds vesting title in the trustees, within a rasonable time, the school for said district shall be established on the tract selected, with right to select another locality should such deeds not be made to the satisfaction of the Governor. And if no such donation is made or perfected in any district within one year from passage of this act, the prorata share of the fund going to said district shall go into and be prorated in the regular common school fund in said district.

"Sec. 5. Be it further enacted, That the principal of said schools shall, under the direction of the trustees, keep an account of all receipts from the sale of the produts of the farm or shop which are not consumed in said school, and one-half of said receipts for each year shall be set aside as a fund to pay the students. That each pupil, having performed to the satisfaction of the principal his studies for an entire school year, (shall receive his prorata of said fund, the amount going to each pupil not to exceed one hundred dollars, and the balance, if any, to be placed in the general fund of the school.

"Sec. 6. Be it further enacted, That the course of studies in said schools shall be confined to the elementary branches of an English education, and practical treatises or lectures on agriculture in all its branches, and the mechanics, arts and such other studies as will enable students completing the course to enter the Freshman Class of the State College of Agriculture."

The course of study is worked out on the same plan as the Alabama course of study. Eleven such normals are provided for. Tuition is free.

In Illinois, the John Swaney School, located in Putuam County, provides for four years of regular high school work. Additional periods are given to agronomy, household science, animal husbandry, and horticulture. This school is the result of local interest and support.

Indiana has a purely agricultural school at Winona Lake. This institution is a private enterprise. The course covers two years. With the exception of Bible study, every subject is closely related to the "science and practice of agriculture." The following course indicates the nature of the work done in this school:

COURSES OF STUDY.

(Junior Year.)

Fall Term No. 7.—Chemistry of Elements and of Foods.
4. Agricultural Botany.
5. Breeds of Horses, Cattle, Sheep and Swine.
2. Stock Judging.
1. Parliamentary Practice.
1. Farm Accounts.
1. Climatology.
Winter Term No. 6. Chemistry of Soils, Manures and Fertilizers.
3. Vegetable Gardening.
3. Plant Physiology.
4. Dairying and Dairy Practice.
2. Farm Bacteriology.
3. Poultry.

SENIOR YEAR.

Fall Term No. 4. Farm Crops.
3. Farm Engineering.
3. Care and Diseases of Animals.
3. Economic Entomology.

3. Fruit Growing.
4. Elementary Physics.
2. Stock Judging.
Winter Term No. 5. Feeds and Feeding.
2. Farm Law.
4. Farm Management.
4. Agricultural Physics.
2. Breeding.
4. Forestry.

The Fall and Winter Terms, as given above, comprise the Special Practical Course. The Regular Practical Course includes the above four terms' work, and in addition, two Spring Terms in which the student elects four subjects from those given below for each Spring Term.

Other subjects will be offered when there is sufficient demand for them.

Spring Term No. 5. Agricultural Economics.
5. Chemistry of Soils.
5. Live Stock Management.
5. Milk Production.
5. Advanced Forestry.
5. Economic Entomology.
Spring Term, 1910. No. 5. Agricultural Bacteriology.
5. Farmer's Institute Work.
5. Chemistry of Manures and Fertilizers.
5. Feeding.
5. Butter Making and Dairy Management.
5. Market Gardening.
5. Orchard Management.
Spring Term, 1911, No. 5. Field Crops and Weeds.
5. Farm Machinery.
5. Chemistry of Foods.
5. Agricultural Animals.
5. Breeding.
5. Greenhouse Management.
5. Landscape Gardening.

Bible—There will be one lecture per week on the Bible throughout the course.

Figures refer to number of recitations and laboratory periods per week.

The Guthrie County High School in Iowa provides for three courses—a Latin course, a science course, and an agricultural course. The agricultural course specifies work in stock judging, agronomy, soils, and horticulture in the last three years of the course. The catalogue states that the school aims to meet two needs.

"While a large per cent of our graduates attend higher institutions, yet in arranging the course of study we keep constantly in mind the needs of those of our students who enter active life mmediately upon leaving high school."

Maine does not have any agricultural high schools as yet, but the state is offering a stipend of $500.00 to schools putting in agricultural courses.

Maryland has two agricultural high schools in operation, the first one being located in Calvert, Md. The course recommended by the Maryland State Board of Education, August 28th, 1907, makes provision for agricultural practice and farm mechanics, farm surveying and general agricultural chemistry in the last two years of the high school. The enrolment in the Calvert Agricultural High School is meeting the approval of the community in which it is located. The attendance during the second year was much larger than in the first.

Michigan has a general act of the legislature authorizing the establishment of county schools of agriculture. These schools are supported at the expense of the county. Thus far one county agricultural school has been located, the one at Menominee. Dean French, of the Michigan State Agricultural College, says:

"The school admits children who have passed the eighth grade and furnishes a two-year course in agriculture, manual training, and domestic science, with some work in review of the common branches. Our law permits the establishment of science schools in any county, but so far none other have made any move in that direction."

Minnesota has agricultural courses in a few high schools. The Crockston School of Agriculture, established two years ago, was by legislative act made one of the departments of the University of Minnesota.

Mississippi has recently passed an Agricultural High School Bill, making it permissible for county school boards "to establish one Agricultural High School in the county for the purpose of instructing the white youth of the county in high school branches, theoretical and practical agriculture, and in such other branches as the board hereinafter provided for may make a part of the curriculum." An appropriation of $1000 is to be made annually for each high school "legally conducted." A course of study is in preparation. State Superintendent Powers expects to have ten agricultural high schools in operation before the end of the year.

Some high schools in Montana, Nebraska, Kansas, New Hampshire, Ohio, Oklahoma, Pennsylvania, Utah, and Virginia have agricultural courses, but the teaching of agriculture in high schools has as yet gained no such general acceptance in those states that the agricultural courses may be called a distinctive feature.

Tennessee has four independent county high schools. The law permits counties to levy 15 cents per capita for high school purposes. Two-year courses in Agriculture and Domestic Science are outlined. Mr. V. A. Bright, of the Department of Agriculture, speaks of the Tyner Agriculture High School. This school has been in operation for two years. He says:

"We do not attempt to prepare teachers, but rather make better farmers and housekeepers. The course is intensely practical as well as cultural, and is correlated with other sciences.

"Students in the country are receptive and take a great deal of interest in agriculture. The high school will serve as a check to the country in order for it to hold its youth."

Wisconsin has five county schools of agriculture and domestic science. The course covers a period of two years. Sections of the law state the general outline of the course of study aud the provisions for maintenance:

"Section 6. In all county school of agriculture and domestic economy organized under the provisions of this act, instruction shall be given in the elements of agriculture, including instruction concerning the soil, the plant life, and the life of the farm; a system of farm accounts shall be also taught; instruction shall also be given in manual training and domestic economy, and such other subjects as may be prescribed.

County Schools of Agriculture and Domestic Economy—Number Increased—(Chapter 540, Laws of 1907, amended by Chapter 143, Laws of 1903). Section 10. Any school established under the provisions of this act, whose course of study and qualifications of whose teachers have been approved by the State Superintendent and the dean of the college of agriculture may, upon application, be placed upon an approved list of county schools of agriculture and domestic economy. A school once entered upon such list may remain listed and be entitled to State aid, so long as the scope and character of its work are maintained in suh manner as to meet the approval of the State Superintendent; provided, that he shall not place upon said list more than eight schools. On the first day of July in each year, the secretary of each county school board maintaining a school on the approved list, shall report to the State Superintendent, setting forth the facts relating to the cost of maintaining the school, the character of the work done, the number and names of teachers employed, and such other matters as may be required by the county board of the State Superintendent. Upon the receipt of such report, if it shall appear that the school has been maintained in a satisfactory manner for a period of not less than eight months, during the year closing on the thirtieth day of the preceding June, the said superintendent shall make a certificate to that effect and file it with the Secretary of State. Upon receiving such certificate, the Secretary of State shall draw his warrant, payable to the treasurer of the county maintaining such school, for a sum equal to two-thirds the amount actually expended for maintaining such school during the year; provided, that the total amount so apportioned shall not exceed four thousand dollars to any one school in any one year; when more than one county has contributed to the support of the school,the Secretary of State shall draw his warrant, payable to the treasurer of each county for such portion ofthe State aid as the amount contributed by his county is part of the total amount contributed by all the counties for the support of the school for the preceding year. The Secretary of State shall annually include and apportion in the State tax such sum as shall have been so paid.

"This act provides that the number of county schools of agriculture and domestic economy established in Wisconsin must, until some future provision of the legislature, be limited to eight. Provision is also made for an appropriation sufficient to enable the State Superintendent to make the necessary apportionment."

The high schools in the State of Wisconsin are giving some elementary instruction in agriculture.

There is as yet no definite place hewed out in our system of education for the agricultural high school. State support and state supervision of such schools are to be found in comparatively few states. We are still in the experimental stage in our viewpoint of this new institution. The distinct aims and purposes of this institution are not at all clearly set forth. Hence the diversity of courses of study.

DEMAND FOR AGRICULTURAL HIGH SCHOOLS.

Regardless of the lack of uniformity and definiteness in agricultural courses for high school, there is a widespread demand for high schools that have for their object instruction and training along practical lines in agriculture. Nor is there much difference of opinion as to whether the agricultural high school shall be established as a separate institution located in communities that are essentially rural or whether agricultural courses shall be introduced into the high school with other courses in high schools that are already established or to be established in towns or rural communities. Eighty-five per cent of the state superintendents are of the opinion that the latter is the better plan. Dean French, of the Michigan State College of Agriculture, is of the "opinion that separate schools like the one at Menominee will not increase rapidly, as, in my judgment, the people will see that it will save expenses to introduce agriculture into our regular high schools already established." Aside from the fact that more widespread results will be effected by introducing agricultural courses in established high schools, will such a diversity of courses not also make it posible for the farmer's son as well as the town or city boy to choose the vocation for which he is best fitted?

ADMISSION AND GRADUATION REQUIREMENTS. ATTENDANCE.

The requirements for admission to agricultural high schools and graduation therefrom are similar to the requirements in other schools. No definite data are available to determine the exact number of pupils taking agricultural courses. In Wisconsin, where five separate agricultural high schools have competed for seven years with other high schools, the attendance has increased greatly in all of the high schools in the state. Increase in attendance in high schools having agricultural courses and an increased attendance in other high schools in competition argues largely for the success of this institution.

QUALIFICATIONS OF TEACHERS OF AGRICULTURE.

The qualifications of teachers is always a vital consideration in determining the success of a school system. The successful teaching of agriculture offers no exception to this rule.

Alabama requires a first grade or life certificate for eligibility to teach in a county agricultural high school. California requires at least university graduation. In Georgia, the High School Inspector uses his influence with boards of education to secure competent teachers of agriculture. Supt. Morrison, of New Hampshire, says that "the teachers of agriculture in New Hampshire must be properly trained." In Michigan the law requires that instructors in such schools shall at least be graduates of an agricultural colege. State Superintendent Nelson, of Utah, states that "instructors in agriculture have received their training in the Agricultural College or in some other institution giving special attention to subjects in agriculture." In Wisconsin, the dean of the Agricultural School and the State Superintendent pass upon the academic and professional training of teachers of agriculture in high schools. In all other States, certificates which permit teachers to teach other high school subjects carry with them the same validity to teach agricultural subjects.

A Course for Louisiana High Schools.

The question of industrial education has received wide-spread attention within the last few years. In Louisiana it comes most largely in the form of a greater demand for the teaching of agriculture.

The proposed course in agriculture for Louisiana high schools is one of the results of such demand. The experimental farms in the State, the distribution of literature on agriculture from these and other sources, the lectures delivered on the subject of agriculture all over the State, the organization of corn clubs, the teaching of nature study and the establishment of school gardens, all have been the means of much good in the dissemination of interest in, and knowledge of, the subject. In addition to these agencies for the improvement of agricultural conditions, the subject of agriculture has been introduced in the elementary grades of the public schools of the State. The results of the instruction in the public schools have been meager on account of the inefficient teaching of the subject. Most grade teachers have had no training in this subject, and few have had much valuable experience in this line. There is an impression that, in most instances, the time devoted to the subject might more profitably be given to some other subject.

The inauguration of the agricultural course in connection with either, or both, of the other two courses, ought to mean much in the agricultural development of the State. With its favorable climatic conditions, with its unsurpassed fertility of soil, with its means of transportation, there is no other State in the Union offering larger possibilities per acre for agricultural development.

Yet, the success of the movement depends upon a proper beginning. An attempt on the part of untrained men to teach the agricultural subjects would retard the movement more and bring it into greater discredit than the earnest efforts of a number of succeeding years could counteract. The incompetent teacher would at once be the object of ridicule. Farmers would, from the start, have no confidence in any efforts he might put forth.

How, then, shall this movement be inaugurated? We believe that a number of places should be selected where there is some local demand for a high school education for the farmer's boy that will have a direct, practical bearing upon the experiences of his farm life, that will intensify his interest in, and love for, such life. In charge of each of such schools there should be a progressive, broad-minded and sympathetic board, superintendent, and principal. The individual put directly in charge of the work in agriculture should not be any of these individuals, but he should be a young man who has made specific preparation to fill such a position. Such training would give immediate prestige to the work. The best results to be achieved require that such individual make his home in the community where he is at work, that he become a regular member of the school's faculty, that he put himself in close touch with the farmers of the district in which he labors.

It would seem that the most logical place for these men to come from is the State University. Such men would know the agricultural conditions that prevail in the State. By experience and training they would be in sympathy with such conditions. Through them the University Experiment Station could come into closer touch with the farmers because of their personal knowledge of the value of the work that is being done. They would have the advantage of frequent interviews with the teacher of agriculture, and would have the opportunity to observe the results of his efforts in their sons' attitude toward the subject of agriculture.

Another point to be considered is, that many ambitious boys who would otherwise go to professional and business life might be directed to take an advanced course in agriculture in the Agricultural College.

To make the agricultural course of unquestionable value, the writer has secured the co-operation of Dr. W. R. Dodson and Prof. Albert F. Kidder, of the Louisiana State University Experimental Station, in working out definite, specific, detailed syllabi for the agricultural courses. These syllabi are to serve as reliable guide-books for schools contemplating to take up the science work along agricultural lines.

For the purpose of bringing the introduction of the teaching of agriculture in the "Approved High Schools" to the notice of those who are interested in the subject, the following factors are proposed for consideration:

The four-year course in agriculture should have equal recognition from the State Department of Education with the other courses:

1. Provided, The teacher of agriculture hold a B. S. A. degree from an approved agricultural college;

2. Provided, Such teacher work in conjunction with, and under the direction of, the experimental station connected with the State University;

3. Provided, Such teacher be under the authority of the school board, superintendent, and principal, as are all of the other teachers in the school;

Provided, He teach the elementary agriculture in the grades and the agricultural sciences in the high school, and supervise the school gardening of the "Approved School" with which he is connected;

5. Provided, That the school applying for the inauguration of an agricultural course shall offer experimental grounds, separated from the regular school grounds, the area of which shall be at least two acres;

6. Provided, That such school shall be subject to the same inspection of the State Department of Education as any other "Approved School";

7. Provided, That the minimum value of science equipment for agricultural purposes shall be $300.

COURSE OF STUDY.

Agricultural Botany.

General principles of the anatomy, morphology, physiology and ecology of plants, involving an experimental study of the seed, shoot, root, flower and fruit.

An intensive study should be made of types belonging to plant families of chief economic importance in the community and State. Little attention should be given to inconspicuous groups.

Under the study of seed should be included the testing of seed by germination, propagation of plant species by means of crosspollination, seeds, buds, graftings, layerings and cuttings. Selecting of seed for the next year. Study of growth of grasses and leguminous crops.

Under the study of the shoot, leaf, root, etc., in plant growth, should be included experiments showing the relation of plants to soil, light, temperature, air, and moisture. Methods of cultivating and pruning. Weeds and injurious insects and their extermination. Diseases of plants and their treatment. Spraying and the destruction of injurious fungi.

Methods of gathering, grading, storing and shipping farm product are appropriate problems in plant culture.

Zoology.

General principles of zoology derived from study of the typical animal families found in the locality where the course is given. *Make an intensive study of the best and most available representative types peculiar to the locality.* The choice of these types should be distributed among different classes of vertebrates, insects, mollusks and echinoderms.

Inter-relation of plant and animal life. The economic value of different forms.

The general physiology of the above types, including human physiology, involving the essentials of digestion, absorption, circulation, respiration, secretion, excretion, cell-metabolism and nervous function.

Feeding, housing and handling of farm animals. Breeding, Stock Judging. Hog Raising. Poultry Raising. Dairying. Diseases of animals and their treatment.

General properties of matter, porosity, elasticity, cohesion, adhesion, fusion, etc. Farm carpentry and farm blacksmithing to make application of these properties.

Composition of forces involved in pulling weights and dragging loads.

Principles of farm machinery, as involved in levers, pulleys, engines and pumps.

Lighting, heating and ventilating.

How to determine average temperature and rainfall. Atmospheric pressure and weather maps.

Capillarity as involved in a study of plant growth and soil.

Soil formations. Tillage, Surveying, movement of soil, water and drainage.

Methods of digging trenches. Tiling. Making plans and determining cost.

Chemistry.

Chief physical and chemical characteristics of oxygen, hydrogen, carbon, nitrogen, chlorine, phosphorus, potassium, calcium and iron as they enter into the composition of air, water, soils, woods, breadstuffs and fertilizers.

Chemical analysis of soil. Assimilation of different elements by plants. The composition of fertilizers. Animal foods. Poisons for destroying injurious insects and fungi. Analysis of milk, cream and butter.